

PUBLIC HEALTH REPORTS

In this issue



U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service



PUBLIC HEALTH REPORTS

Volume 71, Number 9

SEPTEMBER 1956

Published since 1878

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Public Health Reports, published since 1878 under authority of an act of Congress of April 29 of that year, is issued monthly by the Public Health Service pursuant to the following authority of law: United States Code, title 42, sections 241, 245, 247; title 44, section 220. Use of funds for printing this publication approved by the Director of the Bureau of the Budget, September 17, 1954.

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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PUBLIC HEALTH SERVICE
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Cooperation Between Departments of Health and Welfare

By JONAS N. MULLER, M.D., M.P.H., and PEARL BIERMAN, M.A.

IN 1952 the Joint Committee on Medical Care of the American Public Health and Public Welfare Associations posed the thesis that the interests and practices of public health and public welfare were bringing the agencies concerned closer together(1). This was not a new thesis but a restatement that was especially timely in the light of the Social Security Act amendments of 1950(2,3). These amendments made possible federally matched direct payments to the providers of medical care for certain needy persons and established the Federal-State program of aid to the permanently and totally disabled.

During the past few years, through a field

survey in 8 States and 10 local areas, the APWA and the APHA have sought to determine what cooperative activities are conducted in some official health and welfare departments.

Method of the Study

The States and localities selected for study were among those in which we might expect to find an optimum potential for close working relationships between the departments. These were:

California: Alameda County, city and county of San Francisco, San Mateo County; Maryland: Carroll County; Massachusetts: city of Quincy; New Jersey: city of Newark and Essex County; New York: Ulster County; Oregon: city of Portland and Multnomah County; Washington: city of Seattle and King County; Wisconsin: Rock County and the cities of Janesville and Beloit.

In each State, we arranged meetings with personnel in the State health and welfare departments, and in at least one local area. Occasionally some State personnel accompanied us on local visits. The meetings were informal and frequently led into topics which heretofore had not been considered jointly by the health and welfare staffs.

The typical meeting found top representation from administration, medical social work staff from both departments, medical directors or consultants of the welfare departments, supervisors of public health nursing, and, espe-

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This report is an adaptation of a paper presented by the authors at the 83d annual meeting of the American Public Health Association, November 17, 1955, and of a paper prepared and presented by Dr. Muller at the Biennial Round Table Conference, American Public Welfare Association, December 2, 1955.

cially from the welfare department, staff responsible for development of policy and standards. In one area, only two administrators appeared. At the other end of the scale, the chiefs of practically all operating units in both departments met with us.

Open-ended, but directed, questioning was used. Each agency was first asked to describe its overall program, with particular attention to the provision of health services to needy persons. Questions were then directed at relationships in regard to referral of patients, exchange of information, followups, and continuity of service. An attempt was made to call for illustrations of specific problems such as services to tuberculosis patients and to their families; preventive services to mothers and children; the determination of incapacity in aid to dependent children and aid to the permanently and totally disabled and the application of preventive and rehabilitative services once such a determination was made. Case histories often were used to illustrate relationships or the lack thereof, particularly by the local agencies.

This more or less clinical approach was followed by questions designed to bring out inter-departmental relationships arising out of service responsibilities. Since this was generally the most successful method of achieving information, the present report is organized under service titles.

In the preparation of this report, we have drawn upon the meager literature on health and welfare department relationships and also upon the knowledge of agency operations gained in work with such departments.

Patterns of Cooperation

There are many patterns of cooperation between health and welfare agencies which differ in form and degree. Most of them relate to activities somewhat remote from the recipient of service, and few are vigorously directed at the prime goals of health. Moreover, cooperation is practiced relatively seldom and is rarely explicitly defined as policy.

This is not to say that there is noncooperation between health and welfare staffs. There is often simply no relationship on the adminis-

trative level. In this connection, Dr. Palmer Dearing, Deputy Surgeon General, Public Health Service, said before the Conference of State Public Welfare Directors in 1950:

"It is conceivable that an effective program might be developed without any formal provisions for cooperation." However, he went on hopefully to say that, "if health and welfare staffs work closely and congenially together and consult spontaneously whenever they deal with interrelated problems, they will inevitably make plans together and define areas of responsibility . . ." (2).

Unfortunately, we have found that many health officers specifically avoid the responsibilities arising out of the fact that disease is most prevalent among persons known to welfare agencies. We were told frequently that the health department feared being labeled as an agency for the indigent if it made any special provisions for health services to the needy.

Public welfare departments—dedicated to the prevention of abnormal dependency and to the achievement and maintenance of normal, secure, and productive social living—have the same objectives as public health agencies.

To help clients realize these goals, the welfare department will require professional help in the administration of a medical care program. The definition of medical care is a broad one and includes many of the personal health services which may be provided by or through the health department (1).

"Medical care is essential for individual well-being. Its objectives include the promotion of health, the prevention of disease and disability, the cure or mitigation of disease, and the rehabilitation of the patient. Medical care for needy as well as other persons must be geared not only to treatment of disease but also to preventing its occurrence or progress. For those needy persons who are already disabled, all possible use should be made of rehabilitation services so that individuals may be restored to productive living, may cease to require the continued services of other members of the family, and may be enabled to live as useful and happy lives as possible within the limitations of their disabilities."

If preventive services are not known to the welfare program, if they are difficult to obtain, or even refused, then the welfare department will have to establish them. This need has been acute for some time in regard to child welfare

and may soon be as acute in other welfare programs, such as services for the aged.

Welfare departments are acquiring medical administrative machinery, knowledge, and skill. They have long been concerned with long-term illness and disability and with the aged. Services for unmarried mothers, for dependent and foster children, for the aged, and for the prevention of delinquency all involve extended health responsibilities. The alert health officer is interested in all these areas and will help the welfare department find efficient methods of providing the required services. The cooperative efforts of health and welfare agencies will improve the health of the entire community.

Public Health Nursing

Public health nursing services are the most widely used of the health department services available to clients of public welfare agencies. Extensive field relationships between caseworkers and public health nurses, for the most part, appear to revolve around episodes or cases. These relationships are generally informal and unplanned, often the result of an accidental joint visit to a household. In only 1 of 8 States was there evidence of State policy directed at promoting such relationships except in the limited field of institutional inspection. This lack of definition of responsibility generally applies to local agencies as well.

In a number of communities, however, the services of public health nurses have been made available systematically to people served also by the public welfare agency. In Ulster County, N. Y., nurses from the county health department provide bedside care, including injection of medications, as an extension of the teaching program, for welfare clients who are home-bound. Staff nurses obtain information concerning the family and home from the welfare caseworker. Case conferences are organized by field workers of the two departments on the initiative of either staff. Informal conferences, apparently more common, also are reported in the regular work sheets.

Some nursing services also are available at local nursing stations and at health department headquarters. The increasing caseload among the aged has increased the bedside care func-

tions of the nurse although the number of patients is not great. Staff representatives of the health and welfare departments have met to consider methods of meeting the need for home nursing service without disrupting the public health nursing program.

The Ulster County public health nurses bring advice on nutrition to welfare families. Nutrition consultation from the State health department thus serves the local welfare agency indirectly. Public health nurses also survey health care of children in foster homes.

This county has a well-developed orientation and inservice training program for staff nurses which draws upon the welfare staff. Much of the teaching is carried out in case conferences which involve all of the community agencies related to the particular case. At the time of our visit, there was no such use of health department personnel in the public welfare agency.

Services for Children

State public health personnel participate actively in both administrative and clinical services for child welfare. Standards for child care facilities and programs of all types are often developed jointly. In several States, the maternal and child health division of the health department provides medical administrative and clinical consultation to the division responsible for child welfare in the welfare agency. In Maryland, a good deal of time has been spent on how, and by whom, health supervision should be provided in foster care and adoption programs. In Wisconsin, requests for consultation have been limited to problem cases, but the board of health participated in establishing the standards for medical care in the foster home program, as well as the standards used by the division for children and youth of the department of public welfare in licensing children's institutions and day care centers.

Locally, the health department is likely to be engaged only in direct clinical services—child health conferences, crippled children's services, and, to a lesser extent, child guidance clinics. Occasionally these services are operated jointly, and the crippled children's services may be under the local welfare department. Relation-

ships are probably developed most extensively in the crippled children's program.

In many States, services for handicapped children engage both State health and welfare agencies, and sometimes, other State and local agencies as well. Primary State responsibility for the State-Federal program is in the health department in 32 States and Territories, in the welfare department in 8 States, and in a combined health and welfare agency in 1 State. In the remaining 11 of the 52 States and Territories reporting in 1954, the program is administered by special commissions (4 States), by departments of education (3 States), and in 4 States by the State medical schools (4). Where cooperation is practiced, relationships may extend to case finding, organized referral systems, case conferences, foster home placement, acceptance of responsibility for payment for care, the determination of eligibility, and clinical services.

In California, the State program of crippled children's services is administered by the health department, but in about half of the counties the welfare department has been assigned responsibility by the local board of supervisors. On request, consultation may be provided by either State agency whose field workers maintain an active relationship to determine the best ways of providing consultation.

In Massachusetts, the public assistance and child guardianship divisions of the department of public welfare have agreed to pay the costs of care for their clients when crippled children's service funds are lacking in the department of public health.

In New York State, case finding for the crippled children's program is an accepted responsibility of welfare workers, as well as of health department staff. As long-term custodial care for children who cannot be rehabilitated is difficult to locate, problem cases are discussed by staff members of both agencies. In practice, most of the relationships in New York's program are between the State health department and the local welfare departments. The active support of this relationship by State welfare department policy is important. The welfare departments aid in finding foster homes for handicapped children. For children who are not found eligible for the Medical Rehabilita-

tion Program (the crippled children's service in this State), welfare resources are occasionally called upon to provide services such as certain forms of orthodontic care.

In North Carolina, financial eligibility for care under the crippled children's program of the State board of health is determined by the State board of public welfare. This service, based upon a written agreement, is part of the State's policy of applying a uniform standard of eligibility for health services at State expense. In addition to investigation and certification of eligibility, the State board of public welfare agrees to assist with case finding, to provide transportation for patients to and from clinics and hospitals, to help in locating special equipment and services when crippled children's funds are limited, and to provide casework service to the patient and family in the adjustment to long-term treatment. These services are provided through the county welfare departments under instructions prepared by the State board of public welfare and reviewed by the crippled children's department of the State board of health (5). Similar agreements define the responsibilities of the board of public welfare in relation to the cancer program of the State board of health; tuberculosis sanatorium care provided by the North Carolina sanatoriums; correction of defects under the school health program of the board of public instruction.

Tuberculosis Control

The association between tuberculosis and economic deprivation calls for vigorous measures to prevent infection and to treat patients served by welfare agencies. In this area of communicable disease control, interdepartmental cooperation is highest, particularly between local agencies.

In their 1950 reports to the Public Health Service, 11 State welfare departments reported some type of tuberculosis control or hospitalization responsibility (6) although major responsibility rested with the State health department. It would be reasonable to expect some kind of relationship between these two State agencies concerning their responsibilities for certain tuberculosis control activities. Nevertheless, the annual report on State tuberculosis

control programs for fiscal years 1954 and 1955 (7) notes as one of the continuing administrative problems "lack of coordination of program activities among all interested State and local agencies."

Cooperation in disease control by State agencies was not evident during our visits. One agency head feared that any notification to welfare clients of the availability of preventive services could be considered coercion and therefore was not an appropriate public assistance activity. A welfare client, he thought, should have the normal opportunity to find out that a chest X-ray survey was due in his neighborhood and any action by the public assistance agency concerning the survey might make the client feel that he had to have an X-ray.

In Wisconsin, however, where the State anti-tuberculosis association and the State board of health cooperate in sending mobile X-ray units around the State, each county welfare department is informed, through the State welfare department, when the unit is coming. All possible channels are used to encourage county agency clients to use the service. The latest tuberculosis control report of the Wisconsin State Board of Health notes that nursing homes are receiving special attention. Oregon also

reported special efforts in regard to nursing homes with indigent residents. In this State, representatives of both State boards confer to arrange care for tuberculosis patients.

We found that few local health departments have encouraged the welfare departments to give new clients a chest X-ray. A somewhat larger number of departments, State and local, notify local welfare agencies of chest survey schedules and help them achieve a high level of client participation. A few health departments have conducted campaigns to find tuberculosis among residents of nursing homes, homes for the aged, and lodging houses for single men. Health departments not infrequently provide X-ray facilities, as well as tests for syphilis, for screening possible foster parents or operators of child care facilities. Routine health examinations for personnel of other care facilities, or for health or welfare department staffs are relatively rare.

After diagnosis, coordinated services are needed to help a patient to recover. The patient and his family need to understand the disease and the treatment program. The patient requires knowledge of his family's status and assurance that they will not be neglected. With the patient under hospital care, there

Facilities for Research in Health Related Sciences

The Health Research Facilities Act of 1956, signed by President Eisenhower on July 30, 1956, authorizes the appropriation of funds not to exceed \$30 million for each of 3 years to assist in financing the construction of facilities for research in the sciences related to health. The act defines these sciences as including medicine, osteopathy, dentistry, and public health and the fundamental and applied sciences when related thereto.

Assistance will be in the form of grants-in-aid to public and nonprofit institutions. The Federal Government's share is limited to not more than 50 percent. Costs for the acquisition of land or off-site improvements and obligations made prior to the award of the research grant are not creditable for matching purposes.

The Congress has appropriated the first \$30 million to the Public Health Service. The funds are to be used, as the act specifies, in providing either or both (1) additional research facilities through the construction and equipping of new buildings or (2) the expansion, remodeling, alteration, and equipping of existing buildings.

A National Advisory Council on Health Research Facilities will establish policies and approve regulations for the administration of the new program. A grant-in-aid must have approval of the council before it can be awarded by the Surgeon General.

The Division of Research Grants, National Institutes of Health, Bethesda 14, Md., will supply application forms and any information requested.

should be periodic reports to and from the community agencies concerned with the patient and his family. Case conferences to set rehabilitation goals and make appropriate pre-discharge plans smooth the path back to active life. When care on an ambulatory basis becomes possible from a clinical point of view, social, economic, and public health problems which stand in the way of such therapy must be solved by coordinated efforts.

The integrated service of a combined local department of health and welfare, as in San Mateo County, Calif., has pioneered in meeting the needs of patients with tuberculosis. This department is responsible for the county institutions as well as for the full range of public health and public welfare services.

The entire tuberculosis control program is under the medical director of the sanatorium, to assure continuity of service from case finding and diagnosis through followup. A full-time public health nurse at the sanatorium keeps liaison with the field staff. Problems relating to the treatment plan for a patient are usually worked out in the district by frequent and informal meetings between the public health nurses and caseworkers.

If difficulties require administrative consideration, the family is brought to the attention of the supervisors. Medical consultation is immediately at hand. The staff confers on patients under care twice each month. A representative of the social service division participates whether or not the patient receives public assistance.

Planning 2 to 3 months ahead in anticipation of discharge from the sanatorium applies to every public patient in San Mateo County. The sanatorium itself has a rehabilitation program in which a representative of the district office of the State bureau of vocational rehabilitation shares. Psychiatric services also are provided. Thanks in large part to the relationship established by the department in this program, an unusually low proportion of patients leave the sanatorium against medical advice.

Services for Chronically Ill and Disabled

In most communities, unfortunately, relationships in regard to chronic diseases and adult

rehabilitation are not strikingly different from relationships in regard to disease control, with a few possible exceptions.

Basic Studies for Program Development

In two States noted for their chronic disease programs, California and New York, departments share actively in basic studies for program development. New York State studies have been concerned with the extent of chronic illness and disability. In California, the director of the State department of social welfare served on the advisory committee for the chronic disease investigation conducted for the legislature in 1949 by the State department of public health. Welfare directors of 38 counties contributed their experience as well. Welfare officials contributed also to the 1954 health survey conducted by the chronic disease service of the State department of public health.

Mutual Support of Legislation

Cooperation on legislation, though somewhat rare, was noted in several States. Development of the Lemuel Shattuck Hospital in Boston, operated by the Massachusetts Department of Public Health, may be credited to the joint planning of the health and welfare departments and to their mutual assistance in preparing and supporting legislation required for its construction. This hospital for persons with chronic diseases is a base for both service and research.

Case Finding

Case finding is not widely practiced in welfare departments except in relation to communicable disease. For example, no State welfare department in 1950 reported to the Public Health Service responsibility for diabetes control(6); only 7 State welfare departments reported contributing to heart disease control; only 8 to cancer control. This listing, however, does not cover "unofficial" responsibilities. Massachusetts, for example, is not included although the State health department's 26 tumor clinics regularly refer to the welfare department cancer patients who require and are unable to afford long-term care.

While welfare departments do play a part in case finding for certain communicable diseases, most welfare staffs do not yet have suffi-

cient knowledge to be an effective case-finding instrument for the noncommunicable chronic diseases.

Determination of Disability

Health department clinics in orthopedics, venereal disease, rheumatic fever, chest diseases, and cerebral palsy often help welfare departments determine a client's disability. The general medical services, including clinics, of about 70 local health departments across the country are the major or sole source of medical care for welfare patients in these areas. A few of these departments, such as the Baltimore City Health Department, have attempted to work toward the prevention of disease, especially chronic disease, by offering physical examinations. A few, such as the health department in Newark, N. J., have disability evaluation units. And here and there, a local health officer serves as medical member of the welfare department's review team for eligibility for aid to the disabled.

Rehabilitation

Aggressive concern with rehabilitation is a relatively recent development in welfare work (8), encouraged undoubtedly by the newest category of public assistance, aid to the permanently and totally disabled. Accompanying this new interest, however, is a certain feeling of frustration due, no doubt, to many long years of failure to obtain rehabilitation services for public welfare clients. Hence, a few welfare departments have developed their own rehabilitation programs (9).

For most departments, this choice is neither wise nor possible. It ignores the resources of the local health department for the development, application, and coordination of rehabilitation services. Certainly the public health staff can help welfare workers concerned with rehabilitation problems by interpreting the social meaning of medical findings and acquainting them with the medical aspects of rehabilitation.

There are a few places, however, where health departments have put their long experience with habilitation and rehabilitation of crippled children to effective use for all age groups. We know of only one State where this is policy:

Washington, where every local health officer serves as medical consultant to the district vocational rehabilitation counselor. Weekly meetings serve the day-to-day administrative needs of the vocational rehabilitation program. In addition, monthly conferences include any other local agency with an interest in a case on the agenda. The State health officer feels that this arrangement has been successful.

The California State Department of Public Health has been of help in the development of policies and procedures for improving opportunities for rehabilitation among the disabled parents of recipients of aid to needy children. The detailed story of the several interrelated projects involving the State department of social welfare, the bureau of vocational rehabilitation, and the department of public health is told in a series of publications (10-14).

Institutional Standards and Licensure

Probably the best developed cooperative relationships at State level revolve around institutions, particularly their licensing. Information obtained from 44 States in 1953 indicated that in 30 States the health department had legal responsibility for the program for all institutions serving older people (15). Six States assigned to the welfare department the accrediting program for all such institutions. And in eight States, responsibility was assigned to the health or welfare department according to the nature of the institution. The 1950 State health department reports to the Public Health Service indicate that, while health departments have major responsibility for licensing medical-institutions in most of the States, welfare departments are responsible for most child care facilities in the States where there are licensing provisions; and in a few States, the welfare agency is responsible for the general or special hospital facilities (16).

Expert guidance, consultation, and field service from personnel skilled in health and social services are required if programs of licensure or other forms of accreditation are to be more than perfunctory. Both health and welfare agencies know that licensing can be a "tool" to achieve a higher level of care and service. General health care, rehabilitation, the prevention of

secondary disability, accident prevention, the use of nursing, nutrition, and social services, all call for their joint attention.

Cooperative efforts range from contractual agreements to informal but regular visits by field personnel of the licensing agency to the local health or welfare office for exchange of information. Joint action may include:

- Definition and approval of standards.
- Assignment of responsibility for various aspects of the inspection and licensing program.
- Development of an educational program for the participating agencies, their local opposite numbers, and for the operators of facilities.
- Exchange of information relating to the licensed facilities.
- Coordinated efforts, when necessary, for enforcement of the licensing law and regulations.

These activities may be based on law or they may grow out of contractual agreements. In some places, the policy of each agency specifies working with other agencies to meet the responsibilities assigned by law or custom to one or the other agency. Most commonly, however, these joint activities, as do so many others, rest on the authority of custom.

One of the successful statutory requirements for sharing responsibility in an institutional licensing program is found in Kansas. "Adult boarding homes," which include proprietary skilled nursing, personal care, and simple shelter facilities, are licensed by the State department of social welfare. The law calls for the participation of the State board of health and the State fire marshal as well as county health and welfare departments and the local fire and safety authorities. Child care facilities are licensed by the State board of health in conjunction with State and local agencies indicated above. In each area, teams jointly inspect the homes. Their visits are supplemented by calls by individual team members to help the home administrator.

In Sedgwick County, interdepartmental meetings have grown out of the licensing program. At these meetings, boarding home management and care of their residents, and child welfare and child care facilities are discussed.

Even in this apparently well-planned development, however, a recent study of the attitudes of public health nurses in the adult boarding home program reveals complaints of overlapping responsibilities, difficulties with representatives of other agencies, slights to professional prestige, and administrative failure to heed their professional judgments. Nevertheless, this joint program has improved and increased agency services to recipients of public assistance and has certainly increased the quantity of preventive health services made directly available to these recipients (17, 18).

In California, a tripartite agreement on standards and licensure responsibilities is observed by the State departments of public health, social welfare, and mental hygiene in regard to sheltered care for older people. The agreement results from a policy of working together to define the tasks that arise from responsibilities assigned by law to one or another department; to outline the knowledge, technical skills, and contacts of each department which could help the assigned agency to meet its obligation; and to agree on the use of all of the appropriate resources. Actually, joint conferences in this State preceded the writing of the law, to assist the legislature in preparing the requisite legislation. Such conferences are a regular feature of interagency relations in the California State Government. Mutual support of legislative programs and budget requests, based on understanding and an appreciation of common interests, is a natural outgrowth of this policy.

Oregon also offers interesting examples of interdepartmental institutional services. The State board of health licenses nursing homes and periodically circulates a list of licensed homes to the State and local welfare departments, a service that is by no means common, however elementary. The field staff of the licensing division visits the county welfare offices to learn what the staff knows about care in local nursing homes. This productive relationship, although found in a number of States, is often overlooked even in States with well-developed relationships in other areas.

The criteria for rates of payment to nursing homes were developed by the Oregon Public Welfare Commission with board of health con-

sultation to relate payments to services needed and received.

Day care centers for children, a responsibility of the Oregon Public Welfare Commission, must have standards certified by the board of health to be eligible for monthly State aid. Group care homes for mentally and physically handicapped youngsters, licensed by the board of health, must meet standards set in part by the public welfare commission.

In Maryland, an interdepartmental committee sets criteria for rates of payment by the welfare department for nursing home care. A similar joint committee, with representation from health, welfare, and education develops standards for the licensure of day care centers in Maryland.

In Massachusetts, day care facilities for chil-

dren, licensed by local health departments, use standards developed by a joint committee of the State departments of public health, public welfare, mental health, and education. Consultants of these departments are available to the local areas on request through the district offices of the State department of public health.

Illinois provides another "example of the way in which the health and welfare departments can work together to improve the service provided." The State department of public health, the licensing agency, sends to the public assistance agency copies of all letters to individuals operating or planning to establish nursing homes. This enables the State public assistance agency to exchange information with county welfare departments concerning nursing homes which have been or are about to be licensed.

Nine Grants for Hospital Research

Nine grants totaling \$367,182 for new research and demonstrations in hospital service and administration were announced in July by the Public Health Service of the Department of Health, Education, and Welfare.

The research is aimed toward improving the care of patients in hospitals and health facilities, reducing costs, and helping to make the benefits of hospital and health services more widely available.

The University of North Carolina School of Medicine, Chapel Hill, will study the referral of patients from rural areas to the outpatient clinic of the university hospital.

The University of Tennessee College of Medicine, Memphis, will demonstrate how a coordinated hospital plan for the entire State can be developed.

The University of Michigan, Ann Arbor, will initiate two projects: (1) A study of how the organization, staffing, and procedures in 20 Michigan hospitals are related to the type of care the patients need and receive, and (2) a study of the relationship of administrative and supervisory practices in hospitals, motivations and job satisfaction of the employees, and effectiveness of job performance and organization.

St. Louis University, St. Louis, Mo., will develop a program of graduate study in hospital administration at the doctorate level for advanced students to carry on research.

Columbia University School of Public Health and Administrative Medicine, New York City, will study the influence of different patterns of organizational and community relationships and of new hospital construction on the quality of medical, hospital, and related health services.

The Council of Jewish Federations and Welfare Funds, New York City, will study the coordination of the facilities of the general hospital with the resources of other medical and related community services.

The Minnesota Department of Health, Minneapolis, will initiate a project to demonstrate how the quality of service given patients in State hospitals can be improved through the development of methods for inservice training.

The American College of Physicians, Philadelphia, will study methods for minimum standards of quality and efficiency for evaluating the practice of internal medicine in hospitals.

Observations of the public assistance visitor and of physicians who treat public assistance clients are transmitted to the health department. The two State agencies have cooperated, when indicated, in revoking or refusing a license. This close cooperative arrangement has helped to improve the quality of care in the commercial and other nursing homes in the State (19a).

Local departments of health usually have limited relationships with State institutional licensing programs whether they be administered by the State health, welfare, or other agency. The local department may serve as a source for a sanitarian. On the other hand, county welfare departments are often prime sources of information on nursing homes and similar facilities, even when the State licensing program is administered by the health department. Unfortunately, there is rarely a two-way flow of information to enable the local agencies to know what recommendations have been made to institutions, what disciplinary action is pending, or which facilities are currently approved.

New York provides a notable exception to this generalization. Here the State department of social welfare administers the "approval" program for nursing homes and in addition some county health departments license these institutions. To help maintain the positive direction of these parallel accrediting programs, a working agreement has been developed between the respective authorities.

The report of a recent APHA study of the chronic disease activities of selected local health departments states that 72 departments (of 187 selected for study) license institutions caring for persons with long-term illness or disability. Seventy-one said that they participated with other community agencies in establishing standards of care in these institutions. Few indicated a solitary role in standard-setting. The report will be presented at the annual meeting of the American Public Health Association in November 1956.

Nutrition Consultation

Nutrition consultation is a popular and useful institutional service which crosses depart-

mental lines (20). The APHA study reported that, of the departments selected, 70 offer such consultation to institutions caring for the chronically ill and disabled. Forty of these departments employ a professional nutritionist; the others presumably draw upon a State consultant or upon their public health nursing staff.

The Nassau County (New York) Health Department has a unique feature of teaching nutrition in a program directed generally at improvement of service in nursing homes. A local licensure provision assigns to the department responsibility for setting standards and licensing nursing homes. The consultant services of a nutritionist from the State department of public health are available to the local department and there has been some direct service to nursing homes from the State health department personnel. Medical consultation relating to diet is available within the county department. Results of the Nassau County program with respect to food practices, safety, and nursing care confirm the usefulness of this educational approach (21).

The Illinois Department of Public Health also maintains a nutrition consultation service in its licensing program (22). In Maryland and Wisconsin, nutrition consultation is offered not to institutions but to the welfare department staff concerned with standards and licensure for children's institutions.

Payment for Institutional Services

Although public agencies have a growing responsibility for payment for institutional services, no one of the agencies is likely to have a staff adequate to ascertain that the public monies are well spent for institutional care. In many States, each agency purchases such services separately, with resulting annoyances and inequities to the institutions, and duplication of effort. It is an unfortunately common practice to pay higher rates for the care of bed patients than for patients who get out of bed with or without aid. (We do not recommend decreases in such payments. Rather, in view of the generally low and unrealistic rates of payment to nursing homes, we would call for the eventual application of the principle of payments based on the costs of care.)

There are several examples of cooperative action relating to the rates of payment to hospitals and related facilities, such as the joint committees for nursing homes in Oregon and Maryland mentioned above. Rates paid by the New Hampshire Department of Public Welfare also are based on a classification of nursing homes by the State board of health.

In two States, interdepartmental committees representing the major purchasers of general hospital care have agreed upon methods of establishing hospital payment rates. In Illinois, such a committee has operated successfully for the past 11 years (19b). There the State department of public health, the public aid commission, the division of services for crippled children of the University of Illinois, and the State division of vocational rehabilitation use the same Technical Advisory Committee on the Purchase of Hospital Care. Members are hospital administrators representing the Illinois Hospital Association who meet periodically with representatives of the four participating agencies to advise on a cost formula and payment agreements. The State department of public health provides staff, collects and analyzes the cost reports, certifies the cost figures, and classifies the hospitals. Each agency then agrees to pay hospitals on the basis of the certified costs.

In New York State, a similar plan is co-ordinated by a Hospital Rate Advisory Committee with representatives from health, welfare, education, mental hygiene, and the executive departments. The bureau of research and statistics of the department of social welfare makes the necessary statistical computations and certifies rates to each agency.

Rates paid to hospitals in Massachusetts by the department of public welfare are based on a formula and procedures for cost analysis worked out by the department of health and the State hospital association. In Virginia, the State department of health reviews and certifies hospital cost analysis for the department of welfare and institutions and the division of vocational rehabilitation and advises on hospital administration and licensure.

Interdepartmental services related to institutions appear to demonstrate the only clear-cut and consistent collaborative use of the skills

of State health and welfare departments. But their potential for improvement of institutional services to people has barely been tested. Nor have they been used sufficiently to bring the resources of the two agencies together to consider other areas of mutual concern.

Consultation Outside Institutions

Consultation services are by no means restricted to the institutional setting. In the APHA study already mentioned, 123 local health departments (of 187 respondents) said that they provide consultation to the local welfare department. And 125 departments indicated that they receive consultative services from the welfare department. Only 34 health departments of 187 with some kind of active chronic disease program employ their own social workers. But another 123 departments use social work services obtained through some other agencies.

Asked whether the health department had knowledge of the welfare department policy on food expenditures, four health departments said that the information was not available from the local welfare department. Forty-one of the 187 health departments did not have the information.

In Quincy, Mass., on the other hand, the health department nutritionist has been an active participant in public welfare programs, assisting in training caseworkers and consulting on special diets. She has visited with caseworkers at homes where large families with small budgets need advice on food selection.

The bureau of nutrition of the New York State Department of Health, in addition to providing consultation to the State department of social welfare, has helped to bring together local public health nurses and caseworkers for education on food budgeting and nutrition. State nutritionists have also served as consultants to local interagency conferences of public health nurses, caseworkers, and casework supervisors concerned with specific families and their diet.

General Administrative Services

The California rehabilitation project mentioned earlier (14) was designed not only to

extend the use of rehabilitation services but also to demonstrate the advantages of regular medical consultation to the public welfare program, and to call the attention of local departments to one of the ways of obtaining consultant services. A contractual agreement between the State departments of public health and social welfare calls for the full-time assignment of a medical officer to the welfare department.

New York State also offers examples of effective sharing of professional personnel. A health department nutrition consultant prepared a special diet manual for the department of social welfare and is available for other services. A dental consultant is detailed from the health department to provide services on a part-time basis. And, in an instance that is still unique, a deputy commissioner of health has been assigned to the department of social welfare full time as director of medical care. He has ready access to the resources of both departments, attends staff meetings of both organizations, and acts as interpreter of the programs of both agencies. The background of public health administration has made itself manifest in the medical care program for the needy, notably in rehabilitation services, in nursing home care, and in physicians' services.

The State department of social welfare has vigorously supported requests of the health department for social work staff. It has helped to draw up standards for such staff and has invited health department medical social workers to participate in semiannual meetings of its own medical social workers. The medical social service chief has provided orientation sessions on the welfare program to the public health nurses of the department of public health.

Many State agencies fail to provide staff orientation in programs of related agencies, not to mention their own. Everyone appears to agree on the need for such orientation and most ruefully admit there has not been time to carry out adequate orientation in their own program.

Among devices for achieving knowledge of programs of other agencies is the joint committee, such as the New York State Interdepartmental Health Resources Board with representatives from the departments of education, health, mental hygiene, correction, labor, and

social welfare; the Workmen's Compensation Board; and the Joint Hospital Survey and Planning Commission. Committees of the board provide a machinery for joint planning, coordination, and consultation. Other interdepartmental bodies, not part of the State interdepartmental health council but with health and welfare participation, include advisory committees to the department of mental hygiene and to the State Youth Commission.

None of these bodies is simply a paper representation. All have been concerned with planning and consultation and with joint studies and legislation. The State plan for chronic disease and rehabilitation facilities was thus jointly developed, as was also the rehabilitation program for adult public assistance recipients at the rehabilitation hospital operated by the State health department.

Local services and activities affecting administration of both health and welfare departments have been mentioned above under program titles, such as the use of joint staff conferences concerning patients with tuberculosis, child care, or for the definition of rehabilitation objectives for a patient. Such conferences for the solution of clinical problems play an important part in administration per se. They are, in themselves, manifestations of administrative policy. Case conferences serve also to bring people and agencies together, to understand one another and to exchange ideas and information. Often, the conference results in the definition or clarification of broad policy.

A meeting of the Suffolk County (New York) Health and Welfare Department staffs, about 2 years ago, showed how multiple demonstration case conferences in a workshop setting help achieve "more efficient interagency referral and communication systems" (23) and more direct contact among staff members. As a result, a joint committee was formed to interpret each agency's progress "and to develop further techniques for a better understanding of each agency's program," with consequent increase and improvement in referrals to both agencies.

Joint committees and active membership in community councils of social agencies are familiar methods of approaching common problems. They may be used also as the setting for

joint planning. Joint committees on nutrition, aging, adoptions, mental health, rehabilitation, and nursing homes are among the usual ones. Council committees on housing, on determination of medical indigency, and on medical care for the needy are not uncommon in communities engaged in evaluation of health and welfare services.

In addition to their technical consultation services, health department representatives may serve on the advisory committees of the public welfare program and on the board itself to encourage a preventive approach in both health and welfare programs.

Comparison of State and Local Relationships

Relationships between State health and welfare departments, whether established by law, contract, or verbal agreement, are more likely to be in the administrative area than in the area of direct service.

In local departments, direct service produces the greatest evidence of joint effort although, for the most part, cooperation is personal rather than official. This relationship could be broadened and made more effective by formal State and local policy.

Conclusion

Five years ago, former Surgeon General Leonard Scheele (3), speaking to the American Public Welfare Association, said:

At any gathering of health or welfare people, the need for a cooperative attack upon interrelated problems is likely to be discussed. Public health people talked about it extensively at the recent American Public Health Association meetings in St. Louis. There is an equal eagerness among social workers. Yet, after the meetings are over, a cold, analytical look at actual operations in local communities and throughout the Nation shows that the "trend" toward cooperation is painfully slow. From the standpoint of structure for cooperative action, these organizations seem to be almost as far apart as they were in the days when welfare meant an occasional coal or grocery order and when public health meant a red placard on the home of a scarlet fever patient.

Although our current report describes patterns of cooperation among our State health and welfare agencies, Dr. Scheele's statement

of 5 years ago still applies. It is our impression that we have yet to reach the following four goals of joint activity:

1. Application of the normal program of the health department to the welfare population through active cooperation with welfare departments.

It may be necessary to modify or extend services within the range of knowledge, skills, and budget of the health department in order to meet the health needs of the welfare population. Meeting these needs may, of course, result in establishing an effective program of disease prevention.

Since ill health and disability rank so high among the causes of dependency, there is a moral responsibility and, in many instances, a legal responsibility to make health services available to the population in need.

The role of the welfare department in achieving the full application of the program of the health department to the welfare population requires active encouragement of welfare clients to use health services, especially preventive services. Welfare agencies do not hesitate to offer advice on a family budget or the food content of the diet possible within that budget. The relationship between client and agency offers an equally good opportunity for advice on when and how to use health services.

2. The development of appropriate health promotion and disease prevention activities in the welfare program itself.

A major responsibility of the health officer and his staff is to aid the welfare staff in identifying and developing areas in the welfare program which can serve to promote, protect, and restore the health and social usefulness of the people who come to the department for help.

First and probably most important is intake. Intake offers the ideal opportunity to determine the health status and needs of the potential client. This is the chance, usually neglected, to make preventive health services available as well as to establish a medical plan for the person and family in need.

Once the welfare department has accepted the client for service, the avenues toward health services are many and the guide is usually the caseworker. The achievement of health by the

client, therefore, depends in large part upon the caseworker's alertness to the client's health needs and the worker's knowledge of the community's health resources. The welfare department needs the help of the health department in providing the orientation and knowledge necessary to create a high level of health interest among its staff. In our experience, welfare departments rarely call upon their health colleagues for such help.

Surely it is important for the caseworker who enters the client's home to be alert to the health status of the entire household; to try to ascertain what hazards to health arise out of the physical environment of the home and out of the social dynamics of the life within it. The translation of this knowledge into constructive family action implies health education, for which trained personnel of the health department should be able to offer knowledge, skills, and materials, as well as assistance through staff development programs in the welfare department.

In each of the categories of public assistance administered through the local welfare agency, there are opportunities for health department participation in identification of needs, in planning, in consultation, in the provision or coordination of services. Identifying and planning to meet rehabilitation needs of parents of recipients of aid to dependent children, tuberculosis screening for recipients of old age assistance, and consultation on problems among recipients of aid to the permanently and totally disabled are examples of services now provided in a few places by State and local public health departments.

As to general medical care, every welfare agency has one or more opportunities to tell its clients about services available and to encourage their intelligent use. There should also be opportunities to define the objectives of the medical care program to the providers of service and to assure that the program can function so as to achieve its objectives.

A positive approach to medical care, as distinguished from preoccupation with disease treatment, will emphasize prevention, early diagnosis, prompt treatment, and active rehabilitation. Such an approach will encourage appropriate use of the physician's services

rather than impress upon the client that "he must not seek the doctor's help unless he absolutely needs it." Health department representatives, serving among other members of a medical advisory committee, can help to develop and foster a positive approach to the medical care program.

In some instances, the health department's personnel and services may be all, or part, of the medical care program. Unfortunately, we have found that even when the health department is responsible for the general medical care program, a positive approach does not automatically ensue.

The current emphasis on extension of welfare department services beyond cash assistance implies a continuing increase in the health responsibilities of welfare agencies: services for unmarried mothers, for dependent and foster children, for the aged, and, in some communities, for families at large; and services directed at prevention of juvenile delinquency, control of alcoholism, or at the maintenance and improvement of standards of institutional care. In defining the objectives of these programs and in developing ways to attain their goals, welfare and health departments need to pool their knowledge. This is reason enough for getting together.

3. An increased awareness of the social and economic needs of persons coming to the attention of the health department and a clear understanding of the responsibilities, the potential activities, and the limitations of both agencies in support of people with such needs.

The welfare department has a right to expect that the health department is prepared to make referrals appropriate in content and time. Conversely, the health department has the right to expect appropriate referral for the services it offers. But this right is not fulfilled automatically. Public health nurses may have a hard time relinquishing part of their responsibility for patients, as caseworkers may for their clients. Successful referral programs provide administrative support and assurance through knowledge of personnel and operations, that the best interests of their patients or clients will be served by referral. Regular contact between the agencies concerned is needed to make this possible.

4. The development of the necessary policy and procedures to achieve improved health and welfare services without duplication when several agencies are involved.

Many functions of welfare departments touch those of the health department. And "touch" is often about as far as the relationship goes. This is true particularly when institutional inspection and licensure are assigned the welfare department and the health department is assigned responsibility for the sanitation inspection. This latter function rarely extends beyond the determination of technical compliance with the law and its regulations. The standards of nursing home care appear to have been markedly improved, however, in those States and counties where health and welfare department cooperation has been consciously organized. Crippled children's services, the tuberculosis control program, and rehabilitation services for adults likewise are improved where there are mutual responsibilities.

Examples of cooperative activities directed toward this goal range from organized referral procedures and a policy of using interagency case conferences to written contracts for the provision of specified services under stated conditions and to mutual study of long-range needs and support of legislation.

When these objectives of joint activity are reached, efficient operation will be assured, and the potential for better service, where responsibility overlaps, will be recognized. Each agency will be sensitive to the needs, and aware of the resources, lying outside of its own area of service.

To date, in the words of former Surgeon General Parran (24) : "... In the tremendous problem of providing [health services] for the indigent, the social welfare agencies have taken the lead, largely because health departments have been unwilling or unable to accept this as a direct responsibility. The situation, however, is somewhat analogous to the relation of the health officer to the public water supply. He must know the needs for an adequate supply of potable water. He champions the provision of such a supply. He sees to it that the water plant is properly operated, even though this may be done by another branch of the city govern-

ment. This is the minimum responsibility which the health department should assume, both for the public water supply and for the public medical service needed by those unable otherwise to provide it. In fact, the health department should be instigator of and friend to all useful activities for the conservation of life and health. For if health officers do not recognize their responsibility, using all the methods given us by science, to organize community attacks upon the causes of ill health, the public health profession will revert to the ancient status of sanitary police, and other public medical agencies will be established to deal with the major health problems of today and tomorrow. We may be sure such problems will be dealt with."

REFERENCES

- (1) Tax-supported medical care for the needy. *Am. J. Pub. Health* 42: 1310-1327, October 1952.
- (2) Dearing, W. P.: Medical care for public assistance recipients. *Pub. Health Rep.* 66: 89-97, Jan. 26, 1951.
- (3) Scheele, L. A.: Cooperation between health and welfare agencies: A health officer's view. *Pub. Health Rep.* 66: 163-166, Feb. 9, 1951.
- (4) U. S. Department of Health, Education, and Welfare: Annual report, 1954. Washington, D. C., U. S. Government Printing Office, 1955, p. 66.
- (5) Statement of understanding between North Carolina State Board of Public Welfare and the Crippled Children's Department of North Carolina State Board of Health, Sept. 9, 1947. Raleigh, N. C., 1947.
- (6) Christensen, A. W., Flook, E., and Druzina, G. B.: Distribution of health services in the structure of State government, 1950. Part 3. Personal health services provided by State government. *Public Health Service Pub. No. 184*, part 3. Washington, D. C., U. S. Government Printing Office, 1953, pp. 131-146; 159-171.
- (7) U. S. Public Health Service: State tuberculosis control programs as planned for fiscal years 1954 & 1955. *Public Health Service Pub. No. 396*. Washington, D. C., U. S. Government Printing Office, 1954.
- (8) American Public Welfare Association: The place of rehabilitation in the public welfare program—a statement of policy. *Public Welfare* 13: 47-84, April 1955.
- (9) Muller, J. N.: The rehabilitation program of the department of welfare, City of Chicago. *Public Welfare* 13: 3-7, January 1955.
- (10) Lefson, L.: Rehabilitating public assistance recipients. *Public Welfare* 11: 47-50, April 1953.

- (11) Lefson, L.: From public assistance to gainful employment. *Performance* 3: 4-5ff., April 1953.
 - (12) California State Department of Public Welfare: A medical study of incapacitated fathers receiving aid to needy children. Sacramento, March 1954. Processed.
 - (13) California State Department of Education: Rehabilitation of disabled parents in the aid to needy children program. *Bull. California State Dept. of Education* 23, August 1954.
 - (14) Freedman, D. K.: Medical consultation in the State department of social welfare. *California's Health* 12: 113-115, Feb. 1, 1955.
 - (15) Standards of care for older people in institutions. Sec. 2, pp. 77-112, New York, National Social Welfare Assembly, National Committee on Aging, 1953.
 - (16) Mountin, J. W., and Flook, E.: Guide to health organization in the United States. Public Health Service Pub. No. 196. Washington, D. C., U. S. Government Printing Office, 1952, p. 52.
 - (17) Foote, R. E.: The public health nurse in the adult boarding home program. A talk delivered to the public health nursing section, American Public Health Association, Nov. 15, 1955. Topeka, Kans., Kansas State Board of Health, 1955. Processed.
 - (18) Tracy, L. E.: How public health nurses feel about the adult boarding home program. A report delivered to the public health nursing section, American Public Health Association, Nov. 15, 1955. Topeka, Kans., Kansas State Board of Health, 1955. Processed.
 - (19) Bierman, P.: Role of the State public assistance agency in medical care. A series of reports. (a) VII. Nursing home care; (b) V. Hospital care. Chicago, American Public Welfare Association, 1955; 1954.
 - (20) Nutrition services—a summary report of a study of public health nutritionist services to child care institutions and foster family homes. *Children* 2: 236, November-December 1955.
 - (21) Kinnaman, J. H., et al.: Attending the nutritional needs of patients in nursing homes—Theory and practice. *Am. J. Pub. Health* 45: 627-631, May 1955.
 - (22) Ranck, M., and Cunningham, R. R.: The health department and nursing homes. *Pub. Health Rep.* 67: 829-834, September 1952.
 - (23) Suffolk County sees need for interagency contact. *New York State Dept. Health Bull.* 7: 127, Jan. 3, 1955.
 - (24) Parran, T.: Reporting progress. Presidential address to the American Public Health Association. *Am. J. Pub. Health* 26: 1071-1076, November 1936.
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Apparently real geographic variations in mortality from coronary heart disease occur in the United States. Further study of the populations with high death rates and those with low death rates may provide new clues concerning the factors responsible for this disease.

Geographic Patterns in Deaths From Coronary Heart Disease

By PHILIP E. ENTERLINE, M.A., and WILLIAM H. STEWART, M.D.

CONDITIONS for 1950 are more favorable to a study of deaths from coronary heart disease in the United States than for any prior period.

A complete population enumeration, which is important for the computation of death rates, is available for that year. Moreover, the sixth revision of the International Lists of Diseases and Causes of Death, which became effective in 1949, provided a single category (420) under which deaths from coronary arteriosclerosis were to be counted. Also, under the sixth revision of the International Lists, the Manual of Joint Causes of Death was abandoned, and the physician signing the medical certificate of death was given the responsibility for designating the underlying cause of death, the cause used in primary statistical tabulations. (There are a few exceptions to this general rule, but they are favorable to the counting of coronary

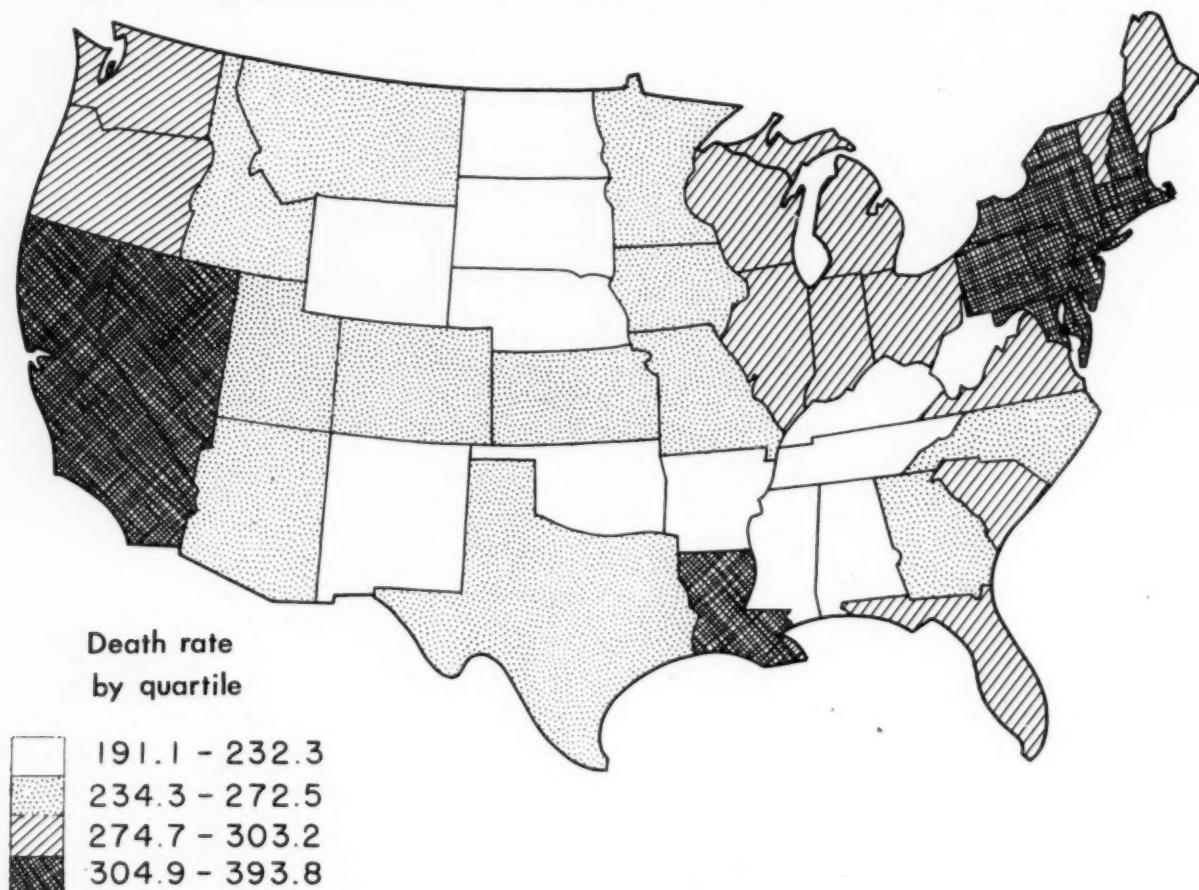
heart disease in primary tabulations.) According to the joint cause manual, if a death certificate carried the diagnoses of nephritis and acute coronary thrombosis, for example, it was counted as a death from nephritis. Under the sixth revision, if the attending physician states that the underlying cause of death is acute coronary thrombosis (coronary heart disease), the death is counted as a coronary heart disease death. (The term "coronary heart disease" as used here is synonymous with the International List term "arteriosclerotic heart disease.")

Geographic Differences

The 1950 death rates for coronary heart disease in the United States present an interesting and thought-provoking geographic pattern, as shown in figure 1 for white males and in figure 2 for white females. The rates for each State and geographic division are given in table 1. These have been age adjusted by the direct method to the age distribution of the total population as enumerated in 1950. Also shown in table 1 are average death rates for the 3-year period 1949-51 for the age group 45-64. The geographic pattern of these rates is essentially the same as the pattern of age-adjusted rates for 1950. Deaths are those coded 420 in ac-

Mr. Enterline is chief statistician of the Heart Disease Control Program, Public Health Service, and Dr. Stewart is assistant director of the National Heart Institute, Public Health Service. This study was initiated while Dr. Stewart was chief of the Heart Disease Control Program.

Figure 1. Age-adjusted death rates for coronary heart disease (420) in white males, 1950.



cordance with the sixth revision of the International Lists, and they have been allocated to place of residence (1).

The death rate for coronary heart disease is roughly twice as high in some States as in others. In New Mexico, Arkansas, and Kentucky, the age-adjusted death rates among white males were 191.1, 201.2, and 211.2, respectively, as compared with death rates in New York, Rhode Island, and the District of Columbia of 393.8, 364.3, and 344.3. For white females the contrast is even greater, with death rates of 83.4, 87.8, and 89.0 in New Mexico, Arizona, and Nebraska, as compared with death rates of 217.4, 176.6, and 175.6 in New York, New Jersey, and Rhode Island. There is a definite tendency for States with similar death rates to cluster.

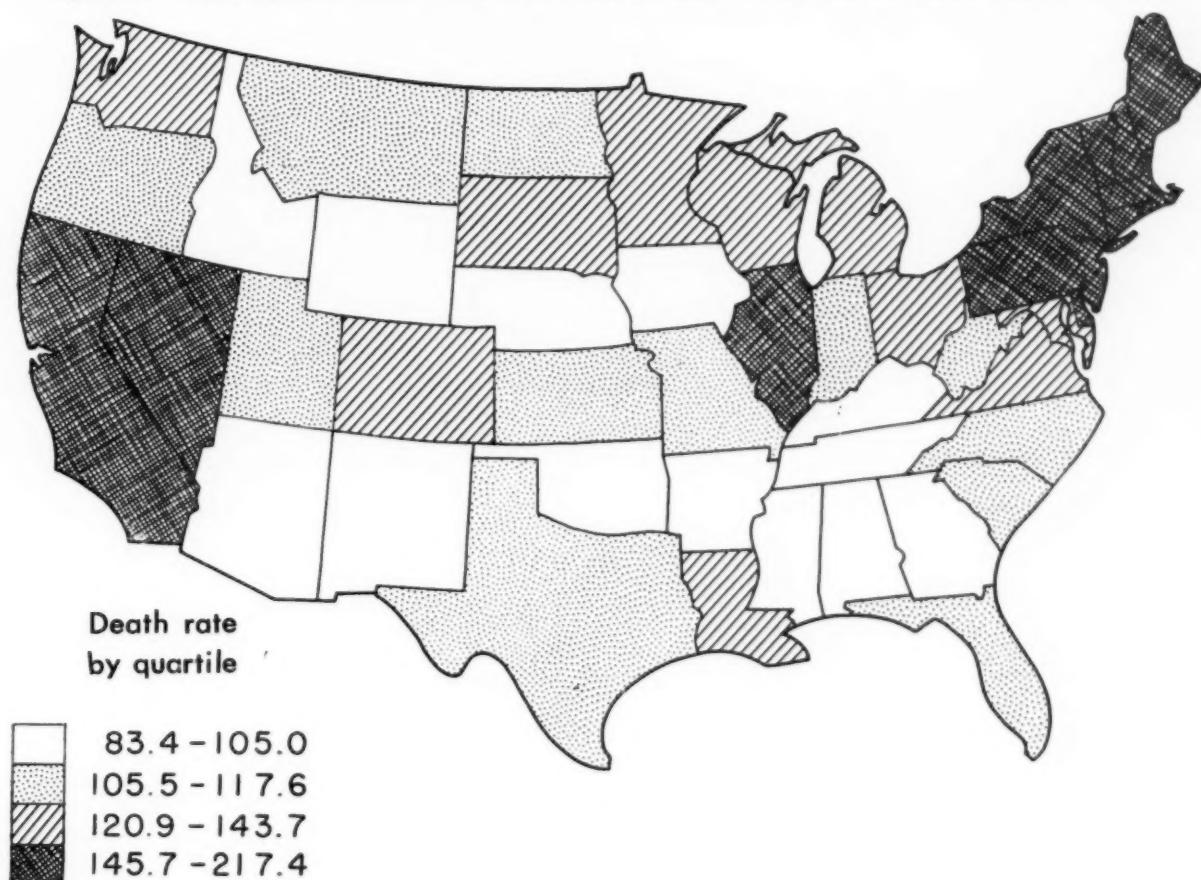
Because coronary heart disease has been recognized as an important clinical entity only since about 1920, it seems possible that dif-

ferences in the observed death rates among States might be due to differences in diagnostic criteria. There are, for example, differences in the amount of medical care available in various sections of the country which may in some way be associated with the likelihood of coronary disease being diagnosed at the time of death. Although the possibility that the observed differences are artificial can be tested only indirectly, the available evidence suggests that the differences in death rates in various parts of the country shown in figures 1 and 2 are real.

Effect on Deaths From All Causes

In the middle and older age groups, coronary heart disease deaths make up a large proportion of the deaths from all causes. As shown in table 2, about a third of all deaths among white males in the age group 45-74 are due to coronary

Figure 2. Age-adjusted death rates for coronary heart disease (420) in white females, 1950.



heart disease. It would be expected, therefore, that if real geographic differences in the death rates from coronary heart disease exist they would be reflected in differences in the death rates for all causes.

Data shown in table 3 for white males indicate that the coronary heart disease death rate does affect the death rate for all causes. Generally, in geographic divisions where the death rate for coronary heart disease is high, the death rate for all causes is high. This relationship is most striking in the age groups 55-64 and 65-74. In the age group 65-74 much of the variation in the death rates for all causes among geographic divisions is, in fact, eliminated when coronary heart disease deaths are excluded.

In the age group 75-84, there appear to be important differences in the diagnostic criteria used in the various geographic regions. This is suggested both by less association between the death rates for coronary heart disease and

the death rates for all causes in this age group as compared with other age groups and by a tendency for death rates for coronary heart disease to be negatively associated with death rates for all causes excluding coronary heart disease. It is probable that some deaths in the age group 75-84 called coronary heart disease in the Middle Atlantic States, for example, are called something else in the East South Central States. Diagnostic differences in the older age groups are to be expected in view of the increasing multiplicity of diseases present at time of death with increasing age, which makes identification of the underlying cause difficult. The numbers of deaths in the older age groups and the probable magnitude of the differences in diagnostic criteria are not sufficiently large, however, to account for an appreciable proportion of the geographic variation in the death rates shown in table 1.

Table 1. Death rates per 100,000 population for coronary heart disease,¹ white males and females, by geographic division and State

Geographic division and State	Age-adjusted rates, 1950 ²				Rates for age group 45-64; 3-year average 1949-51			
	Male		Female		Male		Female	
	Rate	Quartile ³	Rate	Quartile ³	Rate	Quartile ³	Rate	Quartile ³
New England	332.3		167.8		591.7		179.7	
Maine	280.6	3d	145.7	3d	533.4	3d	152.8	4th
New Hampshire	339.6	4th	159.7	4th	590.3	4th	155.2	4th
Vermont	303.2	3d	154.5	4th	559.4	3d	148.1	3d
Massachusetts	337.4	4th	171.0	4th	612.6	4th	188.0	4th
Rhode Island	364.3	4th	175.6	4th	613.4	4th	194.0	4th
Connecticut	339.9	4th	173.4	4th	565.6	3d	176.6	4th
Middle Atlantic	355.6		191.0		619.6		209.9	
New York	393.8	4th	217.4	4th	653.4	4th	223.2	4th
New Jersey	330.1	4th	176.6	4th	588.8	4th	194.3	4th
Pennsylvania	312.7	4th	159.3	4th	580.8	4th	196.7	4th
East North Central	290.5		137.7		535.2		150.8	
Ohio	289.1	3d	137.3	3d	541.3	3d	151.3	3d
Indiana	282.4	3d	117.4	2d	530.8	3d	136.0	3d
Illinois	293.4	3d	146.4	4th	545.2	3d	157.1	4th
Michigan	299.0	3d	135.6	3d	542.8	3d	154.1	4th
Wisconsin	282.5	3d	143.7	3d	488.9	2d	144.3	3d
West North Central	253.2		113.6		452.2		116.3	
Minnesota	272.5	2d	122.3	3d	457.8	2d	125.5	2d
Iowa	266.1	2d	121.3	3d	466.8	2d	119.7	2d
Missouri	246.4	2d	113.2	2d	458.6	2d	123.6	2d
North Dakota	232.3	1st	116.8	2d	374.3	1st	110.1	2d
South Dakota	232.1	1st	120.9	3d	438.2	2d	113.2	2d
Nebraska	221.3	1st	89.0	1st	435.3	1st	90.6	1st
Kansas	255.0	2d	105.6	2d	449.2	2d	102.2	1st
South Atlantic	270.2		118.4		520.1		131.3	
Delaware	330.7	4th	152.1	4th	546.9	3d	176.6	4th
Maryland	304.9	4th	137.9	3d	568.4	4th	146.7	3d
District of Columbia	344.3	4th	137.5	3d	613.1	4th	137.7	3d
Virginia	276.5	3d	122.7	3d	521.5	3d	134.7	3d
West Virginia	229.5	1st	113.2	2d	429.2	1st	137.4	3d
North Carolina	248.2	2d	107.2	2d	473.6	2d	117.7	2d
South Carolina	294.2	3d	108.8	2d	596.4	4th	137.7	3d
Georgia	247.9	2d	102.8	1st	477.2	2d	116.6	2d
Florida	274.7	3d	117.6	2d	569.5	4th	128.4	2d
East South Central	220.0		99.9		398.7		108.3	
Kentucky	211.2	1st	105.0	1st	380.5	1st	107.5	1st
Tennessee	217.4	1st	96.1	1st	385.6	1st	106.1	1st
Alabama	229.3	1st	101.3	1st	422.1	1st	114.5	2d
Mississippi	231.9	1st	92.2	1st	430.9	1st	105.2	1st
West South Central	246.0		106.2		459.5		107.9	
Arkansas	201.2	1st	90.5	1st	388.0	1st	92.7	1st
Louisiana	321.9	4th	138.0	3d	572.4	4th	149.3	3d
Oklahoma	222.3	1st	95.5	1st	436.6	2d	95.8	1st
Texas	247.0	2d	105.5	2d	453.2	2d	104.1	1st
Mountain	247.5		110.4		440.8		112.9	
Montana	250.9	2d	112.1	2d	494.5	3d	129.6	3d
Idaho	246.3	2d	99.4	1st	467.7	2d	106.7	1st
Wyoming	229.6	1st	90.8	1st	433.3	1st	90.4	1st
Colorado	258.5	2d	125.4	3d	446.4	2d	131.3	3d
New Mexico	191.1	1st	83.4	1st	309.0	1st	79.2	1st
Arizona	234.3	2d	87.8	1st	427.1	1st	89.8	1st
Utah	258.2	2d	113.8	2d	434.8	1st	118.5	2d
Nevada	333.4	4th	162.6	4th	569.6	4th	129.3	2d
Pacific	324.4		141.2		594.3		151.1	
Washington	292.8	3d	124.5	3d	539.2	3d	134.6	3d
Oregon	277.6	3d	109.8	2d	511.2	3d	120.6	2d
California	340.2	4th	149.1	4th	620.0	4th	159.0	4th

¹ International List No. 420.

² Direct method using total United States population in 1950; adjusted in 10-year age groups, under 5, 5-15

³ 85 and over.

⁴ Twelve States are in each quartile; the District of Columbia was assigned to the quartile in which it naturally fell.

Table 2. Number of deaths from all causes and from coronary heart disease and percentage due to coronary heart disease, white males and females, by age group, 1950

Age group (years)	Deaths from all causes	Deaths from coronary heart disease	Percentage due to coronary heart disease
<i>Males</i>			
15-24	14,769	103	0.7
25-34	19,323	943	4.9
35-44	36,293	7,389	20.4
45-54	77,150	25,317	32.8
55-64	142,419	50,238	35.3
65-74	181,770	60,087	33.1
75-84	147,984	41,876	28.3
85 and over	48,249	11,213	23.2
<i>Females</i>			
15-24	7,024	72	1.0
25-34	12,235	278	2.3
35-44	22,915	1,283	5.6
45-54	42,994	5,244	12.2
55-64	79,803	16,497	20.7
65-74	130,712	33,813	25.9
75-84	141,519	35,066	24.8
85 and over	61,785	13,448	21.8

Table 3. Death rates per 1,000 population for coronary heart disease, all causes, and all causes excluding coronary heart disease, white males in selected age groups by geographic division, 1950

Geographic division ¹ and age group	Coro-nary heart disease (420)	All causes	All causes excluding coronary heart disease	Geographic division ¹ and age group	Coro-nary heart disease (420)	All causes	All causes excluding coronary heart disease
<i>Age group 45-54</i>							
Middle Atlantic	3.7	10.6	6.9	Middle Atlantic	19.6	54.0	34.4
Pacific	3.5	10.5	7.0	New England	18.2	50.6	32.4
New England	3.5	9.9	6.4	Pacific	17.5	48.2	30.7
East North Central	3.2	9.8	6.6	East North Central	15.7	49.1	33.4
South Atlantic	3.2	10.2	7.0	South Atlantic	14.3	47.8	33.5
West South Central	2.9	9.1	6.2	West North Central	13.8	44.1	30.3
West North Central	2.7	8.2	5.5	Mountain	13.7	45.5	31.8
Mountain	2.5	9.6	7.1	West South Central	13.4	43.4	30.0
East South Central	2.5	9.1	6.6	East South Central	11.6	44.6	33.0
<i>Age group 55-64</i>							
Middle Atlantic	9.4	25.5	16.1	Middle Atlantic	37.1	111.4	74.3
Pacific	9.1	23.4	14.3	New England	34.0	101.7	67.7
New England	8.9	23.5	14.6	Pacific	32.2	101.1	68.9
South Atlantic	8.0	23.6	15.6	East North Central	29.2	108.2	79.0
East North Central	7.9	23.3	15.4	West North Central	27.0	103.7	76.7
West South Central	6.9	20.9	14.0	Mountain	26.3	99.5	73.2
West North Central	6.8	19.4	12.6	South Atlantic	25.2	103.9	78.7
Mountain	6.4	20.9	14.5	West South Central	23.8	96.4	72.6
East South Central	6.2	20.6	14.4	East South Central	21.2	105.9	84.7

¹ Geographic divisions arrayed in order of magnitude of death rates per 100,000 population for coronary heart disease.

For white females the association between death rates for coronary heart disease and death rates for all causes is similar to that for white males; that is, in geographic divisions where the death rate for coronary heart disease is high, the death rate for all causes is high.

Table 4 shows a refinement of the data in table 3 for white males in the age group 55-64. Excluding deaths due to violence from deaths for all causes does not alter the association shown in table 3. The death rates for two disease categories (list Nos. 421-422 and 330-334) that might be confused with coronary heart disease either tend to be positively associated with the death rate for coronary heart disease or show no association at all. These data strongly support those shown in table 3 in favor of real and fairly large geographic differences in the death rate for coronary heart disease. Similar data for the other age groups likewise support this conclusion. Nevertheless, it is recognized that the differences may, to some extent, be influenced by differences in diagnostic criteria.

Table 4. Death rates per 1,000 population for all causes (excluding violence), arteriosclerotic and degenerative heart disease, and strokes, white males aged 55-64, by geographic division, 1950

Geographic division ¹	All causes excluding violence	Arteriosclerotic and degenerative heart disease and strokes				
		Total	Arteriosclerotic and degenerative heart disease			Strokes, list Nos. 330-334
			Total	List No. 420	List Nos. 421-422	
Middle Atlantic.....	24.1	12.3	10.6	9.4	1.2	1.7
New England.....	22.2	11.4	9.6	8.9	.7	1.8
South Atlantic.....	22.1	11.2	8.9	8.0	.9	2.3
East North Central.....	21.7	11.0	9.1	7.9	1.2	1.9
Pacific.....	21.5	11.5	9.8	9.1	.7	1.7
West South Central.....	19.4	9.3	7.5	6.9	.6	1.8
East South Central.....	19.1	9.2	7.0	6.2	.8	2.2
Mountain.....	18.9	8.7	7.2	6.4	.8	1.5
West North Central.....	17.9	9.1	7.4	6.8	.6	1.7

¹ Geographic divisions arrayed in order of magnitude of death rate per 100,000 population for all causes excluding violence.

Possible Causes

It is productive to speculate as to possible causes for the apparently real geographic differences in mortality from coronary heart disease. One point of particular interest is the fact that whatever the causes are they appear to affect males and females in about the same manner. (There are, however, possibly meaningful differences in the ratio of white male to white female death rates; the ratio ranges from 1.8 in New York and 1.9 in New Jersey and South Dakota to 2.9 in South Carolina and Arizona.)

The most patent explanation for the geographic pattern seems to lie in an association between urbanization and mortality from coronary heart disease. It will be noted that areas of relatively high mortality in figures 1 and 2 tend to be highly urbanized. In support of this theory, Gover and Pennell reported that for 1940 the age-adjusted white death rates for diseases of the coronary arteries and of the myocardium were only about two-thirds as high in rural areas as in urban areas (2).

At this time, mortality tabulations which would permit an adjustment of the 1950 mortality rates for coronary heart disease for urbanization are not available. However, a comparison of the 1940 rates for diseases of the coro-

nary arteries and of the myocardium for urban and rural areas and for rural areas alone with the 1950 rates for coronary heart disease for each of the nine geographic divisions throws some light on the question. This comparison, shown in table 5, indicates that the same geographic pattern persists in rural areas as in the United States as a whole. (The same conclusion is reached if only diseases of the coronary arteries, list Nos. 94a and 94b, are used.) Although there were defects in the identification of coronary heart disease under the fifth revision of the International Lists, which was in effect in 1940, they probably do not invalidate the comparison. It would seem unlikely, therefore, that an adjustment of the 1950 data for urbanization would change greatly the geographic pattern shown in figures 1 and 2.

Most of the current theories which might explain geographic differences in coronary disease fall into two categories—genetic and cultural. With regard to the latter, many possibilities have been suggested, including such things as diet, exercise, and stress. All of these may play a part. There may also be hereditary factors which are manifested by differences in the physical characteristics of populations in various parts of the country (as well as in various parts of the world) and which are in some way re-

Table 5. Age-adjusted rates¹ per 1,000 population for coronary heart disease, 1950, and for diseases of the coronary arteries and myocardium, 1940, white males and females, by geographic division

Geographic division ²	Coronary heart disease (420), 1950	Diseases of the coronary arteries and myocardium (94a,b, 93a,b,d,e), 1940	
		All areas	Rural areas only
<i>Males</i>			
Middle Atlantic	3.6	3.6	3.1
New England	3.3	3.2	2.6
Pacific	3.2	3.1	2.6
East North Central	2.9	2.7	2.2
South Atlantic	2.7	2.4	1.8
West North Central	2.5	2.1	1.6
Mountain	2.5	2.2	1.7
West South Central	2.5	2.0	1.3
East South Central	2.2	1.8	1.2
<i>Females</i>			
Middle Atlantic	1.9	2.4	2.3
New England	1.7	2.2	1.8
Pacific	1.4	1.7	1.6
East North Central	1.4	1.9	1.6
South Atlantic	1.2	1.5	1.2
West North Central	1.1	1.3	1.1
Mountain	1.1	1.4	1.2
West South Central	1.1	1.2	.9
East South Central	1.0	1.2	.9

¹ Direct method, using 1950 population as standard for coronary heart disease, and 1940 population as standard for diseases of the coronary arteries and myocardium.

² Geographic divisions arrayed in order of the magnitude of the death rate per 100,000 population for coronary heart disease in 1950.

sponsible for differences in mortality from coronary heart disease. These theories might be investigated very profitably by studying intensively populations in those areas of the United States experiencing high death rates from coronary heart disease and populations in those areas experiencing low death rates from coronary heart disease.

Summary

For 1950, the age-adjusted death rates for coronary heart disease for white males and white females were roughly twice as high in some States as in others.

The geographic differences are probably not due to differences in standards of diagnosis. However, studies to verify this would be desirable. In those age groups in which coronary heart disease is an important cause of death, the geographic differences in the coronary heart disease death rates are reflected in the death rates for all causes. Moreover, the death rates for two disease categories that might be used in lieu of coronary heart disease show no tendency to be negatively associated with the death rates for coronary heart disease.

The geographic differences do not seem to be due, to any large extent, to differences in urbanization in various parts of the country since they persist if rural areas are examined separately.

Whatever the factors responsible, they appear to affect males and females in about the same manner.

Some of the current theories as to the importance of various factors in the etiology of coronary heart disease might be investigated profitably by studying the populations in the areas of the United States with low and high death rates for this disease.

REFERENCES

- (1) U. S. National Office of Vital Statistics: Vital statistics of the United States (years 1949, 1950, 1951). Part II. Natality and mortality data for the United States tabulated by place of residence, 1949; Vol. III. Mortality data, 1950; Vol. II. Mortality data, 1951. Washington, D. C., U. S. Government Printing Office, 1951, 1953, 1954.
- (2) Gover, M., and Pennell, M. Y.: Statistical studies of heart disease. VII. Mortality from eight specific forms of heart disease among white persons. Pub. Health Rep. 65: 819-838, June 30, 1950.

An Outbreak of *Shigella* Gastroenteritis

By MARTIN D. KELLER, M.D., Ph.D., and MALCOLM L. ROBBINS, M.D.

IN September 1954, an explosive outbreak of gastroenteritis occurred in a rural elementary school in central Ohio. Investigation by the division of communicable diseases of the Ohio Department of Health determined that the outbreak was related to food served in the school cafeteria. The etiological agent was found to be *Shigella sonnei*, type 1.

The American literature contains few well-documented reports of foodborne shigellosis. In 1950, Feig reviewed reports of outbreaks of diarrheal disease received by the Public Health Service from 1945 through 1947 (1). During this period there were 476 outbreaks characterized bacteriologically. Of these, only 14 were associated with *Shigella* organisms (only 3 with *S. sonnei*).

In surveys of normal population groups in the late 1930's and early 1940's, Watt and Hardy found the prevalence of shigellosis by culture to be 11 percent in New Mexico, 4 percent in Puerto Rico, 3 percent in Georgia, and 0.1 percent in New York City (2). In general, the infection rate was greatest in the 1- to 9-year

age group. In a study of clinical cases of diarrheal diseases, Hardy and Watt found that *S. sonnei* accounted for 20 to 25 percent of the shigella infections in New Mexico and in Georgia and for 57 percent in New York City (3).

Investigation of the Outbreak

The first illness in the Ohio outbreak occurred at 3 a. m. on September 22, 1954, and the majority of the cases began during the afternoon and night of the same day. Through inquiry among local physicians and at nearby schools, it was determined that the illness was limited to the children and teachers of one elementary school.

The illness was characterized by fever, chills, headache, abdominal pain, nausea, vomiting, diarrhea, and prostration. In most cases, the temperature (oral) ranged from 100° to 105° F. Several cases began with convulsions. The illness usually lasted from 24 to 72 hours, and severe symptoms rarely persisted longer than 24 hours. None of the patients were hospitalized. About one-third of them were seen by physicians. The drugs most frequently used were neomycin, sulfadiazine, kaopectate, and paregoric.

The school was closed before noon on September 23 because of marked absenteeism, and it remained closed until September 27. The school population consisted of 268 children and a staff of 12. On September 23, visits were made to some of the homes in the community to locate sick children. Eighteen acutely ill children were discovered in this manner, and his-

Dr. Keller and Dr. Robbins, at the time of this study, were officers of the Epidemic Intelligence Service, Communicable Disease Center, Public Health Service, on assignment to the division of communicable diseases, Ohio Department of Health. Dr. Keller is now assistant resident in medicine at the Bronx Veterans Administration Hospital, New York City, and Dr. Robbins was scheduled to become senior resident in pediatrics at the Bronx Municipal Hospital Center on July 1, 1956.

tories and rectal swabs for culture were obtained from them. Rectal swabs from the two food handlers in the school cafeteria and samples of the foods served during the preceding 2 days were also obtained for culture. The only food on the menu that could not be obtained was the potato salad served on September 21.

The parents of the school children were questioned on September 24, and data were obtained concerning the occurrence of illness, the time of onset, the clinical manifestations, and the history of foods consumed in the school cafeteria on September 21 and 22.

On September 25, *S. sonnei*, type 1, was isolated from 12 of the 18 original rectal swabs. Antibiotic sensitivity tests showed the organisms to be sensitive to aureomycin, terramycin, and chloramphenicol, but resistant to sulfadiazine and dihydrostreptomycin.

When the school reopened on September 27, all the children were questioned as to the occurrence of illness, the symptoms experienced, and the foods consumed. Rectal swabs were obtained from all the students and the staff.

Six weeks later, rectal swabs were again obtained from the students and staff, and families

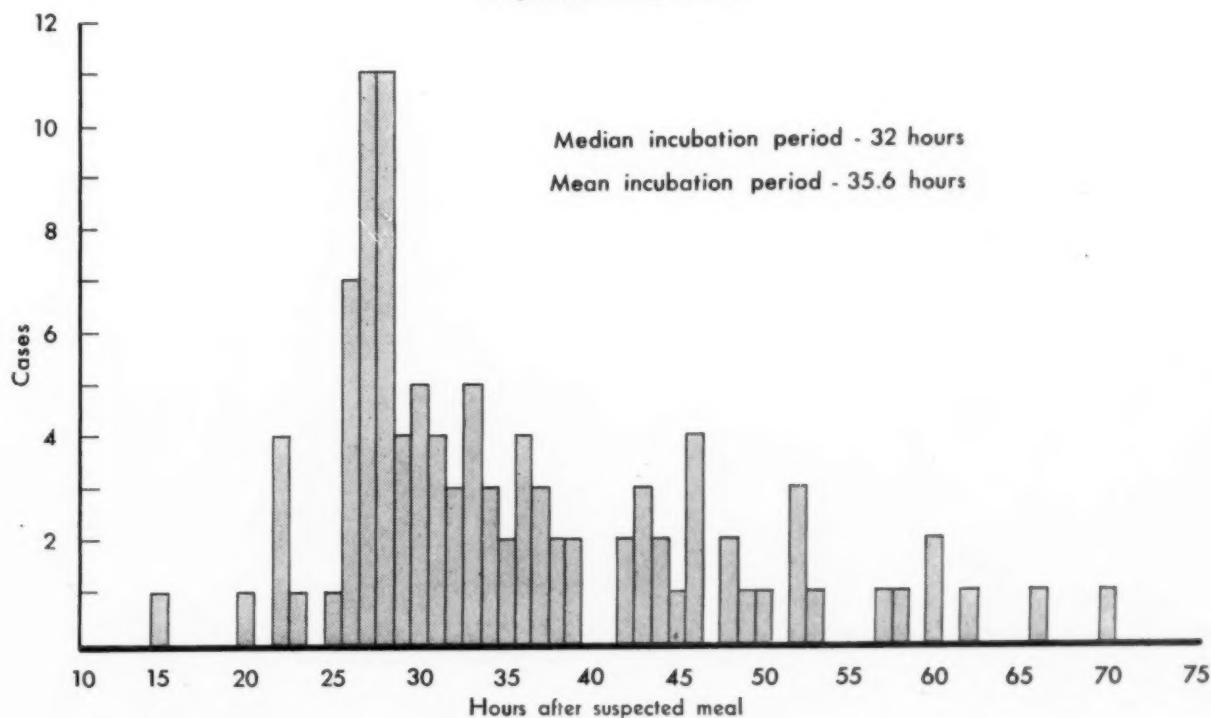
were questioned concerning the occurrence of subsequent illness among other members of the household. No fecal specimens were obtained from the household contacts.

Laboratory Procedures

The fecal specimens were obtained by swabbing the walls of the anal canal with a sterile cotton swab. The soiled swab was placed in a tube containing a broth designed to act as a selective medium. Culture plates were streaked with the inoculated medium on the swab within 6 hours. The broth, which was prepared according to the formula of Hajna from the Bacto dehydrated product, is a medium in which gram-negative organisms are enriched and gram-positive organisms are inhibited (4). It has been shown by Croft and Miller to be particularly effective for the isolation of shigellae if the inoculated medium is kept no longer than 8 hours before streaking culture plates (5).

Colonies of non-lactose-fermenting bacteria from Endo and SS agar plates were transferred to triple sugar iron (TSI) agar slants. Those giving shigella reactions on TSI (alkaline slant,

Figure 1. Onset of clinical cases of gastroenteritis during the acute outbreak, September 22 through September 24, 1954.



acid butt, and negative H₂S) were tested with shigella group serums. After the causative organism was identified as *S. sonnei*, type 1, only the specific antiserum was used in the slide test for identifying suspected cultures.

The isolated organisms were tested for antibiotic sensitivity by the Difco disk method.

Table 1. Illness and culture data related to consumption of suspected meal

Consumption of suspected meal	Ill		Not ill		Total
	Positive culture	Negative culture	Positive culture	Negative culture	
Ate.....	92	56	13	46	207
Did not eat.....	0	3	2	29	34
Total.....	92	59	15	75	241

Table 2. Infection rate related to consumption of suspected meal

Consumption of suspected meal	Infected ¹	No evidence of infection	Total	Infection rate (percent)
Ate.....	161	46	207	77.8
Did not eat.....	5	29	34	14.7
Total.....	166	75	241	68.9

¹ Clinical illness or positive culture, or both.

The food samples were homogenized or diluted and streaked on culture plates. Staphylococcus 110 medium was employed for the isolation of staphylococci, and Endo agar, for the isolation of salmonellae and shigellae. No pathogenic organisms were found.

Bacteriological examination of water samples taken from the school gave negative results for coliform organisms.

Results

The time of onset of illness was learned for 104 of the 151 persons who were ill. The epidemic curve is given in figure 1. After the first case, the curve showed a rapid rise, reaching a peak in approximately 12 to 13 hours. The occurrence of cases then fell off gradually, the final

case appearing 55 hours after the first. The epidemic curve indicates a single source, single exposure epidemic, and it appears that the incriminated meal was the lunch of September 21. This lunch would give an incubation period ranging from 15 to 70 hours, with a mean of 35.6 hours and a median of 32 hours. Feig reported a median of 42 hours in 6 outbreaks of shigellosis (1).

Information on the following was obtained for 241 of the 280 students and staff members: consumption of the suspected meal, occurrence of illness, and results of rectal culture. Illness was defined as the presence of two or more of the following: fever, abdominal pain, nausea, vomiting, and diarrhea.

Only the data for these 241 persons are given in tables 1 through 5. However, partial data were obtained for an additional 32 persons, 20 of whom showed evidence of infection either by illness or by positive fecal culture. No information was obtained for seven of the school population.

The number of persons ill and the number of positive fecal cultures among persons who ate the suspected meal and those who did not eat it are shown in table 1.

Table 2 compares the attack rates based on

Table 3. Clinical illness rate related to consumption of suspected meal

Consumption of suspected meal	Ill	Not ill	Total	Illness rate (percent)
Ate.....	148	59	207	71.5
Did not eat.....	3	31	34	8.8
Total.....	151	90	241	62.6

Table 4. Positive culture rate related to consumption of suspected meal

Consumption of suspected meal	Positive culture	Negative culture	Total	Positive culture rate (percent)
Ate.....	105	102	207	50.7
Did not eat.....	2	32	34	5.9
Total.....	107	134	241	44.4

evidence of infection (clinical illness or positive culture, or both) for the same two categories. These rates offered statistically significant evidence that infection was related to consumption of the suspected meal.

Table 3 shows that for both those who ate the suspected meal and those who did not eat it the rate of clinical illness was nearly as high as the attack rate based on evidence of infection. These findings differ from the expected ratio of clinical cases to carriers.

From table 4, it can be seen that the positive culture rates were substantially lower than the infection rates. However, on the basis of one culture, the rate for those who ate the suspected meal represents a rather high percentage of isolation of *S. sonnei* from an exposed population.

Table 5. Positive culture rate related to clinical illness

Illness status	Positive culture	Negative culture	Total	Positive culture rate (percent)
Ill	92	59	151	61.0
Not ill	15	75	90	16.6
Total	107	134	241	44.4

Table 5 shows that positive cultures were found in 61.0 percent of the persons who were ill, but in only 16.6 percent of those who were not ill.

Table 6, which gives data for 237 of the school children, reveals that there were no statistically significant differences in infection rate for the various ages.

Detailed descriptions of symptoms were obtained for 122 of the persons who were ill. The following symptoms were reported most frequently: diarrhea, for 103 persons (84 percent); fever, for 83 (68 percent); and vomiting, for 49 (40 percent).

Information concerning the specific foods eaten for lunch on September 21 and 22 was considered to be unreliable because of the age of the patients and the general imperfections of memory. Nearly all the students ate some of all of the foods served, as is the custom in school cafeterias.

Table 6. Infection rate according to age

Age, in years	Infected ¹	No evidence of infection	Total	Infection rate (percent)
5	1	1	2	50.0
6	21	9	30	70.0
7	22	11	33	66.7
8	18	10	28	64.3
9	8	13	21	38.1
10	17	7	24	70.8
11	28	6	34	82.4
12	24	10	34	70.6
13	15	4	19	78.9
14	5	4	9	
15	1	1	2	
16	1	0	1	58.3

¹ Clinical illness or positive culture, or both.

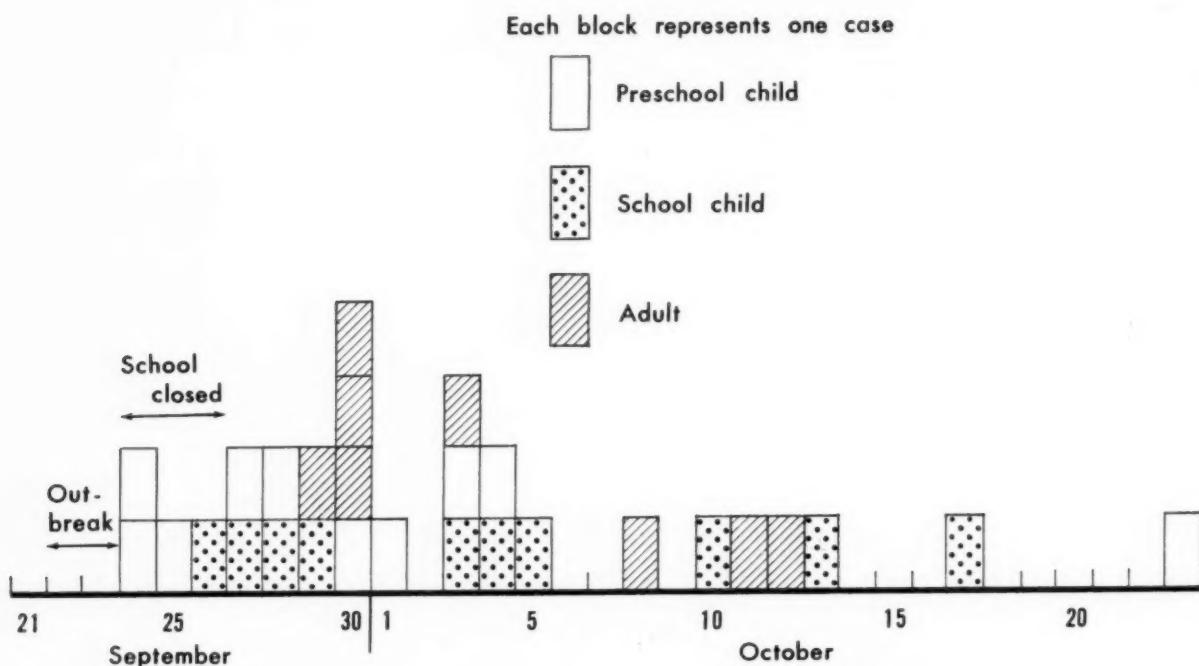
Six weeks after the onset of the first illness, rectal swabs were obtained from 234 of the students and staff members of the school. Only 5 cultures positive for *S. sonnei*, type 1, were found, and of these, only 3 were for persons who 6 weeks earlier had a positive culture. For all 5, 2 consecutive negative cultures were obtained during the following 2 weeks.

Information concerning subsequent cases of gastroenteritis in household contacts was obtained from 81 families 6 weeks after the outbreak. In these families there were 109 children infected during the initial outbreak and 293 household contacts. Twenty-eight of the household contacts were infected, a secondary attack rate of 9.5 percent. The dates of onset of illness and the distribution among preschool children, school children, and adults are shown in figure 2. Illness in household members with no exposure to the source of the infection was considered a secondary infection even though it occurred on the last day of the outbreak.

Discussion

The school lunch of September 21 was considered the common, single source of infection in this outbreak of shigellosis because of its relation to the time of onset of the cases. If the lunch of September 20 were the source, the first case would have had an incubation period of 39 hours and the median of the incubation periods would have been 56 hours. The lunch of September 23 is eliminated because at least seven

Figure 2. Occurrence of secondary cases in household contacts of persons infected during the acute outbreak.



cases had their onset before the lunch was served.

Neither of the two food handlers was ill, but both had cultures positive for *S. sonnei*, type 1. It is possible that they became infected in the same manner as did the rest of the school population. However, it is conceivable that one of them carried the organisms before the outbreak occurred and contaminated the foodstuffs served at the lunch on September 21.

The last contact the children had with one another in school during the outbreak was on the morning of September 23, approximately 46 hours after the lunch on September 21. There is a possibility that some of the late cases were secondarily infected from the early ones. However, it is reasonable to explain the epidemic curve on the basis of a single source and a single exposure.

The attack rate of 77.8 percent, based on the occurrence of illness or the finding of *S. sonnei*, type 1, or both, points to massive exposure of the population of the school. However, 39 percent of those who were ill had negative cultures, and 16.6 percent of those who had no clinical illness were shown to be asymptomatic carriers. It is reasonable to suppose that a considerable

number of asymptomatic carriers were missed, since only one culture was obtained during the outbreak for each person.

Watt and Hardy found that infection without clinical disease was rare in infants, but that it progressively increased up to the age of 5 years (2). Thereafter, it occurred at a fairly uniform rate. For all age groups, the ratio of convalescent or passive carriers to each current case was 9.1. They also found that the ratios were fairly uniform for different types of shigellae. They concluded that manifest sources of infection are rare in comparison to hidden sources. In a study of shigella infection in a closed institutional population, Hardy, Shapiro, Chant, and Siegel found that the ratio of carriers to clinical cases was greater for *S. sonnei*, 24:1, than for *Shigella flexneri*, 7:1, (6).

In the present study, only 5 persons had positive cultures 6 weeks after the initial outbreak, and these became negative on at least 2 subsequent samples within the next 2 weeks. These findings are in keeping with the findings of Watt, Hardy, and DeCapito (7). Of 103 patients with proved shigellosis, 80 percent had positive cultures after the acute symptoms sub-

sided, but the duration of infection after recovery was only 32 days for *S. flexneri* and only 22 days for *S. sonnei*. These investigators felt that the chronic carrier was exceptional in bacillary dysentery and that the organism is more frequently perpetuated in the community by a constantly changing group of hosts.

Cruickshank and Swyer studied an outbreak of 32 cases of shigellosis in a residential school (8). Twenty-nine gave positive cultures initially, and the number of positive cultures decreased slowly until only one was found in the 10th week. However, 10 patients, 34.4 percent of the group, had 2 or more consecutive negative cultures followed by 1 or more positive cultures, and 5 patients had 3 or more consecutive negative specimens over a period of 3 weeks, only to yield positive cultures again. These findings indicate that the data obtained in the present study from one initial culture and one followup culture after a period of 6 weeks can give only a rough estimate of the extent of the original infection and the persistence of the infection in the group. However, the figures obtained by this method are in keeping with those found by other workers.

The Ohio outbreak appears to have been quite different from an outbreak of shigellosis in Oxford, England, reported by Davies (9). In the Oxford outbreak, the first case occurred in a school for infants, but the spread of infection seemed to be mainly in the homes. Of 74 primary cases, 47 occurred in the original school and 27 in 10 other schools. Among the 293 home contacts of these 74 cases, 234 of whom had at least one stool examination, 16.3 percent had clinical illness and 33.3 percent had positive cultures but no clinical illness. In the Ohio epidemic, the school was the immediate source of infection for 81 families. In these families, 109 children were infected during the initial outbreak, and only 28 cases of gastroenteritis were reported among their 293 household contacts. Since no fecal specimens were obtained from the household contacts, the subsequent cases can only be presumed to be related to the initial outbreak. However, it is probable that considerably more persons in these families became infected but did not have clinical illness.

The clinical manifestations observed in the

Ohio outbreak were similar to those described by Blatt and Shaw (10) and Cruickshank and Swyer (8).

Zimmerman, Cooper, and Gruber studied an epidemic of shigella infection in Korea in 1952 (11). They found sulfadiazine therapy unsatisfactory. Chloramphenicol, terramycin, and aureomycin were found to be highly effective, and streptomycin was intermediate. All 13 types of shigellae that they isolated were found to be highly sensitive to chloramphenicol, terramycin, and aureomycin, but not sensitive to sulfadiazine and dihydrostreptomycin. In recent years, few sulfadiazine-sensitive shigellae have been isolated by the Ohio Department of Health laboratories.

Thus, the expense of treating shigella infections poses a special problem. In massive outbreaks in rural areas, where income may be low, it is often not possible to treat all patients with the most effective antibiotics. However, in the outbreaks described in this paper, all those who were ill recovered without apparent complications within a period of a few days, despite the fact that very few were given antibiotic therapy.

Summary

An outbreak of gastroenteritis in a rural elementary school in central Ohio in September 1954 is described. From data collected concerning occurrence of illness, time of onset, consumption of a suspected meal, and results of fecal cultures, it appeared that the outbreak followed a mass exposure to *Shigella sonnei* at a school lunch.

The first illness occurred 15 hours after the suspected meal. After this, the number of cases increased rapidly, and the peak of the outbreak occurred 27 to 28 hours after the meal. The median of the incubation periods was 32 hours, and the range was from 15 to 70 hours.

For 241 of the 280 students and staff members of the school, the following findings were obtained: Of those who ate the suspected meal, 71.5 percent became ill; of those who did not eat this meal, only 8.8 percent. From one fecal specimen taken within 8 days of the beginning of the outbreak, *S. sonnei*, type 1, was isolated

from 50.7 percent of those who ate the suspected meal but from only 5.9 percent of those who did not eat it. Considering those persons who were ill or who had a positive fecal culture, the attack rate for all was 77.8 percent. Of the persons who were ill, 61 percent had positive fecal cultures; of those who were not ill, only 16.6 percent were positive.

Two food handlers gave positive fecal cultures, but they had no clinical illness. No specific food was implicated.

Six weeks after the occurrence of the first case, when 234 fecal specimens were taken, only 5 contained *S. sonnei*, type 1.

Among 293 household contacts of 109 infected children, in 81 families, only 28 (9.5 percent) became ill with gastroenteritis within 6 weeks after the outbreak. Of these, 20 were children under 15 years of age.

Other reports of shigella infection are discussed briefly and compared with the Ohio outbreak.

REFERENCES

- (1) Feig, M.: Diarrhea, dysentery, food-poisoning and gastroenteritis. A study of 926 outbreaks reported to the United States Public Health Service 1945-1947. Am. J. Pub. Health 40: 1372-1394, November 1950.
- (2) Watt, J., and Hardy, A. V.: Studies of acute diarrheal disease. XIII. Cultural surveys of normal population groups. Pub. Health Rep. 60: 261-273, Mar. 9, 1945.
- (3) Hardy, A. V., and Watt, J.: Studies of acute diarrheal diseases. XII. Etiology. Pub. Health Rep. 60: 57-66, Jan. 19, 1945.
- (4) Hajna, A. A.: A new enrichment broth medium for gram-negative organisms of the intestinal group. Pub. Health Lab. 13: 83-89, July 1955.
- (5) Croft, C. C., and Miller, M. J.: Isolation of *Shigella* from rectal swabs with Hajna "GN" broth. Am. J. Clin. Pathol. In press.
- (6) Hardy, A. V., Shapiro, R. L., Chant, H. L., and Siegel, M.: Studies on acute diarrheal diseases. IX-A. *Shigella dysenteriae* infections among institutional inmates. Pub. Health Rep. 57: 1079-1094, July 24, 1942.
- (7) Watt, J., Hardy, A. V., and DeCapito, T.: Studies of acute diarrheal diseases. VII. Carriers of *Shigella dysenteriae*. Pub. Health Rep. 57: 524-529, Apr. 10, 1942.
- (8) Cruickshank, R., and Swyer, R.: An outbreak of Sonne dysentery. Lancet 239: 803-805, Dec. 28, 1940.
- (9) Davies, J. B. M.: Symptomless carriers in home contacts in Sonne dysentery. Brit. Med. J. No. 4777: 191-192, Ju'y 26, 1952.
- (10) Blatt, M. L., and Shaw, N. C.: Bacillary dysentery in children. Arch. Pathol. 26: 216-239, July 1938.
- (11) Zimmerman, L. E., Cooper, M., and Gruber, C. D.: Bacteriologic studies in an epidemic of bacillary dysentery in Korea. Am. J. Clin. Pathol. 22: 549-557, June 1952.

Traineeships for Public Health Personnel

Authorized by the Health Amendments Act of 1956 (P. L. 911), the Public Health Service has appropriated \$1 million to establish a program of traineeships for graduate or specialized public health training of professional public health personnel for the fiscal year ending June 30, 1957.

The funds will include necessary costs, such as living expenses, tuition, and travel, as determined by the Surgeon General. All professional public health personnel are eligible.

Information and application forms may be obtained from any of the regional offices of the Public Health Service, or from the Chief, Division of General Health Services, Bureau of State Services, Public Health Service, Washington 25, D. C.

Survey of General Hospitals Accepting Mental Patients

By BERNARD H. KROLL, B.A., and HYMAN GOLDSTEIN, Ph.D.

DURING the period from December 1951 to May 1953, the National Institute of Mental Health of the Public Health Service conducted a survey of the general hospitals in the United States. The original purpose of the survey was to ascertain which general hospitals accepted as inpatients persons with a primary diagnosis of suspected or actual mental illness in order to bring up to date the number of general hospitals to be included in the census of mental patients. As a result of the survey, the number of hospitals included in the census of mental patients rose to 546 compared with 157 prior to the survey.

Data were also collected on type of patient accepted, hospital size, and the types of therapy available for each hospital offering therapy. It is believed that presentation of data on the types of therapy available at the time of the survey would be useful since such data would serve as a baseline for future studies of the types of therapies available in general hospitals. This is particularly so in the light of the more recent developments in drug therapy, such as the use of reserpine, chlorpromazine, and other tranquilizing drugs, the growth of

general hospital facilities for the mentally ill, and the increasing development of nonhospital treatment for the mentally ill.

Some background on the distribution in the States of the hospitals reporting and those indicating acceptance of mental patients is presented in table 1. Additional tabulations showing in greater detail the distribution of these hospitals are available (see documentation note). Of the 4,716 hospitals surveyed, 4,702, or 99.7 percent, of the hospitals queried reported. Reporting was 100 percent complete for 40 States and the District of Columbia. About 40 percent of the reporting hospitals had average daily resident populations of 50 or more. About 21 percent of the hospitals with average daily resident patient populations of 50 or more accepted mental patients as contrasted to about 6 percent of the hospitals with average daily resident patient populations under 50. It is clear that there is a significant difference in the acceptance of mental patients between hospitals with average censuses of 50 or more and those under 50.

The types of patients accepted by the 546 hospitals reporting the acceptance of mentally ill patients and the type of service offered are shown in table 2. Of these 546 general hospitals, 176, or 32.2 percent, routinely offer only diagnostic workup for patients admitted. This does not imply that occasional treatment may not be given for a selected patient, but it does mean that the hospital acts as a diagnostic and screening center, and patients who are in need

Mr. Kroll is an analytical statistician, Hospital Reports and Records Unit, and Dr. Goldstein is chief, Current Reports Section of the Biometrics Branch, National Institute of Mental Health, National Institutes of Health, Public Health Service.

Table 1. Replies received in the survey of general hospitals, by average daily resident patient populations: United States and each State, 1952

United States and each State	All hos-pitals	Hospitals with average daily resident patient populations					
		50 and over			Under 50		
		Total	Accepting mentally ill	Not ac-cepting mentally ill	Total	Accepting mentally ill	Not ac-cepting mentally ill
United States	1 4,702	1,858	386	1,472	2,844	160	2,684
Alabama	89	25	6	19	64	3	61
Arizona	40	12	3	9	28	2	26
Arkansas	64	13		13	51		51
California	254	118	25	93	136	4	132
Colorado	68	19	4	15	49	1	48
Connecticut	38	30	4	26	8	1	7
Delaware	10	9	1	8	1		1
District of Columbia	13	10	4	6	3	1	2
Florida	101	32	6	26	69	3	66
Georgia	102	23	5	18	79	6	73
Idaho	47	7	2	5	40	3	37
Illinois	219	127	21	106	92	7	85
Indiana	104	47	16	31	57	6	51
Iowa	112	41	11	30	71	3	68
Kansas	115	31	10	21	84	4	80
Kentucky	82	27	8	19	55	2	53
Louisiana	103	26	6	20	77		77
Maine	43	10	2	8	33	1	32
Maryland	41	27	1	26	14	1	13
Massachusetts	128	76	17	59	52	1	51
Michigan	176	75	13	62	101	5	96
Minnesota	163	47	14	33	116	11	105
Mississippi	85	11	1	10	74	6	68
Missouri	107	48	15	33	59	5	54
Montana	46	10	3	7	36	3	33
Nebraska	94	20	7	13	74	4	70
Nevada	14	2	1	1	12		12
New Hampshire	32	14	3	11	18	1	17
New Jersey	90	60	11	49	30	1	29
New Mexico	30	4		4	26	1	25
New York	301	197	29	168	104	6	98
North Carolina	129	49	5	44	80	3	77
North Dakota	39	14	5	9	25	2	23
Ohio	158	101	14	87	57	2	55
Oklahoma	95	15	3	12	80	4	76
Oregon	61	16	2	14	45	3	42
Pennsylvania	222	161	31	130	61	3	58
Rhode Island	12	8	2	6	4		4
South Carolina	58	21	6	15	37	1	36
South Dakota	44	9	4	5	35	1	34
Tennessee	91	19	4	15	72	3	69
Texas	435	60	19	41	375	23	352
Utah	25	8	5	3	17		17
Vermont	22	8	5	3	14		14
Virginia	76	37	5	32	39	6	33
Washington	96	36	10	26	60	3	57
West Virginia	65	35	4	31	30	2	28
Wisconsin	136	58	11	47	78	12	66
Wyoming	27	5	2	3	22		22

¹ The 14 hospitals not reporting were in the following States: 1 each in Arkansas, Massachusetts, New York, Tennessee, and Washington; 2 hospitals each in Florida and Georgia; and 5 hospitals in California.

Table 2. Number of hospitals accepting mental patients, by type of patient accepted and services offered: United States and each State, 1952

United States and each State	All hospitals			Hospitals accepting					
				Psychotics and others			Nonpsychotics only		
	Total	Diagnostic workup only	Diagnosis and treatment	Total	Diagnostic workup only	Diagnosis and treatment	Total	Diagnostic workup only	Diagnosis and treatment
United States	546	174	372	445	136	309	101	38	63
Alabama	9	3	6	7	2	5	2	1	1
Arizona	5	2	3	4	2	2	1		
Arkansas									
California	29	17	12	27	16	11	2	1	1
Colorado	5	1	4	5	1	4			
Connecticut	5		5	5		5			
Delaware	1	1					1	1	
District of Columbia	5	1	4	4	1	3	1		1
Florida	9	2	7	8	2	6	1		1
Georgia	11	3	8	9	2	7	2	1	1
Idaho	5	3	2	3	2	1	2	1	1
Illinois	28	5	23	21	3	18	7	2	5
Indiana	22	8	14	21	8	13	1		1
Iowa	14	6	8	11	4	7	3	2	1
Kansas	14	2	12	13	2	11	1		1
Kentucky	10	4	6	7	2	5	3	2	1
Louisiana	6		6	5		5	1		1
Maine	3	3		2	2		1	1	
Maryland	2		2	1		1	1		1
Massachusetts	18	4	14	11	2	9	7	2	5
Michigan	18	8	10	16	7	9	2	1	1
Minnesota	25	8	17	23	8	15	2		2
Mississippi	7	5	2	6	4	2	1	1	
Missouri	20	4	16	16	2	14	4	2	2
Montana	6	4	2	6	4	2			
Nebraska	11	2	9	9	1	8	2	1	1
Nevada	1		1	1		1			
New Hampshire	4	2	2	1	1		3	1	2
New Jersey	12	5	7	11	5	6	1		1
New Mexico	1		1	1		1			
New York	35	12	23	27	10	17	8	2	6
North Carolina	8	4	4	7	4	3	1		1
North Dakota	7	5	2	6	4	2	1	1	
Ohio	16	1	15	15	1	14	1		1
Oklahoma	7	2	5	4	1	3	3	1	2
Oregon	5	3	2	4	2	2	1	1	
Pennsylvania	34	4	30	25	3	22	9	1	8
Rhode Island	2		2	2		2			
South Carolina	7	1	6	6	1	5	1		1
South Dakota	5	4	1	4	3	1	1	1	
Tennessee	7		7	7		7			
Texas	42	10	32	33	7	26	9	3	6
Utah	5		5	5		5			
Vermont	5	2	3	5	2	3			
Virginia	11	4	7	9	3	6	2	1	1
Washington	13	6	7	11	4	7	2	2	
West Virginia	6	3	3	1	1		5	2	3
Wisconsin	23	10	13	18	7	11	5	3	2
Wyoming	2		2	2		2			

Table 3. Number of hospitals accepting mental patients and offering treatment, by type of treatment offered: United States and each State, 1952

United States and each State	All hospitals ¹	Psychotherapy	Insulin	Electrotherapy	Metrazol or other shock	Psychosurgery	Drug	Fever	Occupational	Physiotherapy	All other
United States	372	305	237	274	68	124	264	130	143	203	47
Alabama	6	6	5	4	2	2	5		2	4	
Arizona	3	2	1	1	1		2	2		1	
Arkansas											
California	12	12	8	7	1	5	9	5	5	8	3
Colorado	4	3	4	4	1	2	4	2	2	3	
Connecticut	5	5	4	4		2	5	1	1	2	
Delaware											
District of Columbia	4	3	1	3	1	1	2	2	2	3	1
Florida	7	6	6	6	1	3	4	4	4	4	1
Georgia	8	7	6	7	3	1	4	3	1	2	1
Idaho	2	1					1				
Illinois	23	18	14	19	4	8	16	10	11	14	4
Indiana	14	9	7	10	1	4	9	8	6	8	3
Iowa	8	8	5	7	3	3	4	3	3	2	
Kansas	12	10	11	6	4	4	10	5	6	7	2
Kentucky	6	4	4	5	1	4	5	2	3	2	2
Louisiana	6	5	5	6	2	2	5	4	2	2	1
Maine											
Maryland	2	2				1	2	1			
Massachusetts	14	12	4	9		3	0		5	9	
Michigan	10	9	8	9	2	3	8	4	4	6	3
Minnesota	17	14	12	11	1	8	15	9	11	13	3
Mississippi	2	2	1	2		1	2	1			
Missouri	16	14	11	14	4	8	13	8	8	11	2
Montana	2	2	1	1	1	1	1	1			
Nebraska	9	6	3	4	1	2	5	1	5	3	2
Nevada	1	1	1	1	1	1	1	1	1	1	1
New Hampshire	2	1					1		1	1	
New Jersey	7	5	5	4	2	3	6	3	1	2	
New Mexico	1	1								1	
New York	23	20	13	19	2	8	15	5	13	6	5
North Carolina	4	3	3	3	2	1	4		1	2	1
North Dakota	2				2		2				
Ohio	15	14	11	14	2	5	12	6	6	10	3
Oklahoma	5	3	3	3	2	1	2	2		1	
Oregon	2	1	1	2		1	1	1	1	1	1
Pennsylvania	30	28	17	25	6	12	23	15	14	21	4
Rhode Island	2	1	1	2				1	1	1	
South Carolina	6	4	5	5		3	5	2		2	
South Dakota	1	1	1	1			1		1	1	
Tennessee	7	5	4	6	2	1	4	1	2	3	
Texas	32	25	26	23	9	7	26	10	9	19	1
Utah	5	5	4	5	2	5	4		2	5	
Vermont	3	3	3	3		1	1			2	
Virginia	7	6	5	4	1	3	6	2	2	6	3
Washington	7	4	4	6	2	1	3	1	1	3	
West Virginia	3	1	1				1	1	1	1	
Wisconsin	13	11	8	7	1	2	7	2	6	9	
Wyoming	2	2				1	2	1		1	

¹ Individual data will not add to the "All hospitals" totals since hospitals offer more than one type of therapy.

of treatment are usually referred to other hospitals after diagnosis. The remaining 67.8 percent of the hospitals indicate that treatment as well as diagnostic services are offered. Again this does not imply that every patient admitted would be offered treatment, but treatment would be available if it were deemed advisable. A total of 445 hospitals, or 81.5 percent of all hospitals accepting mental patients, accept psychotic patients as well as other types. Of those, 69.5 percent offer treatment and the remaining 30.6 percent offer diagnosis only. The remaining 101 hospitals do not accept psychotic patients but will accept other types; 62.4 percent of these hospitals offer treatment, and 37.6 percent do not.

However, hospitals offer varied treatment programs. Of the nine major therapy groups on which data were collected, very few hospitals offered all types. Even if all types were available, the use of these therapies would be selective and would vary depending upon the patient and the alternative therapies available.

Psychotherapy is the most widely used type of therapy (table 3); 305 or 82.0 percent of the 372 hospitals reporting treatment facilities offered psychotherapy, individual or group (57 hospitals offered group psychotherapy but 301 hospitals offered individual psychotherapy).

The next two highest groups are electrotherapy and drug therapy with 73.7 and 71.0 percent of all hospitals offering these therapies among others. The remaining therapies in decreasing order of availability percentagewise were as follows: insulin 63.7; physiotherapy 54.6; occupational therapy 38.4; fever therapy 34.9; psychosurgery 33.3; metrazol and other shock therapy 18.3; all other therapies 12.6.

Summary

A survey was made of the 4,716 general hospitals known to be in operation in the United States during the period of 1952-1953. More

than 99 percent of the hospitals queried replied. Forty percent of these hospitals had average daily resident patient populations of 50 or more. A significantly greater proportion of hospitals with average daily resident patient populations of 50 or more accept mental patients than those with populations under 50.

Of the 4,702 hospitals, 546, or 11.6 percent, accept patients with a suspected or actual primary diagnosis of mental illness. Of these hospitals, 67.8 percent offer treatment as well as diagnosis; the remaining 32.2 percent offer diagnosis only.

Psychotherapy is reported the most widely used therapy, with electrotherapy and drug therapy following closely.

DOCUMENTATION NOTE

Additional tabulations of data from this survey have been deposited as document No. 4960, American Documentation Institute, Auxiliary Publications Project, Photoduplication Service, Library of Congress, Washington 25, D. C. A photoprint copy may be obtained by remitting \$2.50; a 35 mm. microfilm copy, by remitting \$1.75. Advance payment is required. Write checks or money orders payable to Chief, Photoduplication Service, Library of Congress.

The tabulations cover the following subjects:

1. Distribution of hospitals reporting acceptance of mentally ill patients by average daily number of all patients resident in hospital during year and average daily number of mental patients in residence during the year: United States, 1952.
2. General hospitals accepting mental patients and offering diagnostic workup only by type of service and average daily resident patient population of hospital: United States and each State, 1952.
3. General hospitals accepting mental patients and offering treatment by type of service and average daily resident patient population of hospital: United States, 1952.
4. Number of hospitals offering treatment for certain detailed therapies: United States and each State, 1952.
5. Percent of hospitals offering a given therapy of all hospitals offering treatment: United States and each State, 1952.

Addressed originally to the County, City, and District Health Officers Association of New York State, this speech on performance budgeting in experimental installations merits the attention of all health administrators.

Performance Budgeting for the Health Department

By DANIEL KLEPAK, M.P.A.

THE DISTINCTION between program budgeting and performance budgeting to me is more than a question of semantics. In my opinion, program budgeting connotes the gathering of costs by program, that is, so much to inoculate children with poliomyelitis vaccine, so much for clinics, so much for nursing services. If you can separate your costs into clearly discernible programs, then you have program budgeting. Performance budgeting, however, goes further than that. Performance budgeting is the relating of program costs to workload information. If you know the total cost for inoculating children with the vaccine, you have program budgeting. If you know how much it costs to inoculate each child, then you have performance budgeting.

Performance budgeting, as a concept, is not new. For many years various governmental jurisdictions—and most large business corporations—have financed their activities in relation

to services rendered rather than according to things to be purchased. One of the earliest installations—and still highly successful—is the system used by the Tennessee Valley Authority.

Performance budgeting received the greatest impetus in government when the Hoover Commission recommended its use throughout the Federal Government. Herbert Hoover is personally credited with devising the name of a budgeting system which concentrated on ends to be achieved by government rather than on means to be employed.

To make the concept of performance budgeting a little clearer as we go along, let's look at some of the budget tables which I worked up, strictly on an experimental basis, for the Rensselaer County (N. Y.) Department of Health.

Some of these breakdowns you might consider out of keeping with the recommended organization of public health practice, but, if you have good organization in your health department, your performance budget will mirror it.

The Line-Item Budget

A budget for Rensselaer County Health Department as it might look spread out in pro-

Mr. Klepak, associate budget examiner, New York State Division of the Budget, was formerly hospital consultant, New York State Commission on Fiscal Affairs of State Government, and chief of local assistance, New York State Department of Health.

gram style is pictured in exhibit 1. The objects of expenditure on the left and the total amount in the last column on the right follow traditional budget form. The account categories are the standard categories used by counties in New York State.

The traditional budget shows what you purchase for your money, that is, the services of so many physicians, so many typists, and so many other types of personnel; so much for pencils, so much for laboratory supplies, so much for X-ray supplies, so much for fuel, and so on. It does not tell you what you do with your money. It doesn't speak in terms of services.

When an administrator plans a program, he must think about how he's going to immunize children or how he's going to run a tuberculosis hospital, not about how many typewriters, pen-

cils, and staples he will have to buy, how much X-ray film his clinics will need, how many bandages and plasters his nurses will apply, or how much fuel, light, and electricity his department will use. Unless he thinks in terms of services, his frame of reference is completely artificial and strait-jacketing.

The traditional budget gives very little indication of what a department or bureau expects to accomplish during the year. The tyranny of the line-item type of budget causes department heads to continue to think in terms of the tools they must use rather than of the programs they must plan and manage.

A Planning Cycle

Performance budgeting is nothing more than a good financial tool. It is not a panacea; it is

Exhibit 1. Distribution of costs for 1955

Objects of expenditure		Cost centers							
Code and account		Nursing	Clinics	Sanitation	Laboratory	Social service	Maintenance	Administration	Totals
100	Personal service:								
	Salaries	\$82,242	\$18,078	\$42,665	\$37,840	\$8,000	\$7,250	\$46,720	\$242,795
	Temporary service			994	200			500	1,694
	Professional fees		2,295						2,295
290-628	Board of health							1,800	1,800
	Retirement contributions	8,635	1,689	4,027	3,537	750	670	4,380	23,688
	Workmen's compensation	2,105	402	949	765	178	161	1,039	5,599
200	Equipment:								
	Automobiles	5,485	290	2,336				870	8,981
	Office equipment							1,922	1,922
	Technical equipment			283	75	1,000			1,358
300	Supplies and materials:								
	Laboratory supplies					3,600			3,600
	Office supplies							1,500	1,500
	Clinic supplies			1,256					1,256
	X-ray supplies			1,703					1,703
	Maintenance supplies						1,500		1,500
	Books and periodicals							400	400
	Fuel oil						1,500		1,500
400	Printing					800		500	1,300
	Other expenses:								
	Light						850		850
	Rent						2,250		2,250
	Travel (excluding auto expense)							2,355	2,355
	Auto expense	8,420	447	3,543				1,335	13,745
	Telephone							2,750	2,750
	Inservice training							1,984	1,984
	Laundry					100			100
	Miscellaneous and postage							2,899	2,899
Totals		\$106,887	\$26,443	\$54,589	\$47,842	\$8,928	\$14,181	\$70,954	\$329,824

¹ Before distribution of laboratory costs.

not a pushbutton system. With performance budgeting, you will still need professional opinion and administrative judgment to run the department, but this approach to budgeting and to planning will help you see where to direct your energies.

In exhibit 2 we see the various cost centers, or activities or programs, of the Rensselaer County Department of Health and the work units that might be used to measure them quantitatively. In performance budgeting, we try to determine measures for what is being done in any of the health department's programs. Here we are talking about measuring services quantitatively and evaluating them quantitatively, not qualitatively.

We don't try to measure every type of work. For example, the multifarious activities of an administrator of a county health department are, in my opinion, either unmeasurable, or they would take so much effort to measure that you would get little return for your effort.

Nor do we measure social service in a county health department where it may be a very small operation. However, in a large mental hospital such as the Hudson River State Hospital at

Exhibit 2. Cost centers and units of measurable work

Code and cost center	Work unit
01 Nursing-----	Visit.
02 Clinics-----	Clinic session.
03 Sanitation-----	{ Inspection. Weighted inspection. ¹
04 Laboratory-----	{ Test. Weighted specimen point. ²
05 Social service-----	None. ³
06 Maintenance-----	None. ³
07 Administration-----	None. ³

¹ All inspections classified and weighted according to personnel time spent on each type of inspection.

² New York State Association of Public Health Laboratories has recommended adoption of a uniform weighting system for all public health laboratory procedures. Because all local laboratories will probably adopt it for reporting purposes and the recommended standards are reasonably related to activities at Rensselaer County Laboratory, the system has been adopted.

³ None does not mean that no measurable units exist but rather that incurred costs are so relatively fixed that no useful planning or control purpose would be served by comparing costs with units of work done or that the identification and recording of measurable units of work would be uneconomical compared with possible benefits to be gained.

Poughkeepsie, N. Y., where the State has been installing a performance budget system, social service is a large activity, costing approximately \$100,000. There we measure social service by a yardstick or work unit called a contact, either with a patient or his relatives or his prospective employers.

With exhibit 3 we introduce a new concept to budgeting. Here we have analyzed fixed and variable costs for the county's nursing program. If we had taken 1,000 nursing visits, let's say, and divided them into the total cost of a \$5,000 nursing program, we would have obtained a unit cost of \$5.00 for each visit. But that, we feel, is an erroneous way of thinking. Costs have different properties. Some costs are fixed. Others are variable.

In a tuberculosis hospital, for example, the cost of food increases with every additional patient fed. Food is clearly a variable cost. It increases and decreases with the number of hospital patients. But the salary of a dietitian and the salary of the head of the hospital are truly fixed or overhead costs. Since those costs remain constant regardless of the number of people cared for in a hospital, or the number of people visited in a nursing program, we discriminate, in our budgeting system, between variable and fixed costs.

If your nurses were making 10,000 visits a year, and you were to decrease the number of visits by one-half, to 5,000, you could not get along on half your prior appropriation. Only those costs which vary with workload could be decreased. Similarly, if you enlarged the scope

Exhibit 3. Breakdown of fixed and variable costs: nursing costs

Code and item	Variable	Fixed
100 Personal service: Director of nursing-----		x
Supervising nurses (2)-----	x	
Public health nurses (17)-----	x	
Physiotherapist-----	x	
Stenographers (3)-----	x(2)	x(1)
Clerk-----	x	
200 Equipment: Automobiles-----	x	x
300 Supplies and materials-----		
400 Other expense: Automobile expense-----	x	x

of your program, you would not need an increase in funds in proportion to the size of the increased workload. Your fixed costs would remain relatively constant.

Exhibits 4 and 5 show the 1955 workloads for Rensselaer County's nursing program and the clinic program as they looked in December 1954.

Exhibit 4. Nursing visits forecast for 1955

Type of visit	Number of visits in—			Forecast for 1955	
	1952	1953	1954 ¹	18 PHN's ²	24 PHN's
Maternity	2,556	1,683	1,865	2,750	6,000
Health guidance	8,581	5,095	5,424	6,550	12,000
Communicable disease ³	6,781	3,696	2,919	4,400	4,400
Chronic disease	2,692	3,191	3,341	1,000	1,000
Other noncommunicable disease	4,909	3,632	2,046	1,200	1,200
Other neuromuscular skeletal disorders	1,968	1,209	1,275	1,200	1,750
School nursing	276	355	197	215	215
Totals	27,763	18,861	17,077	17,315	26,565

¹ Fourth quarter of 1954 is estimated.

² Staff of 18 public health nurses is basis for forecast; next column shows visits expected with increase in staff.

³ Includes tuberculosis.

Exhibit 5. Clinic workload forecast for 1955

Type of clinic	Total for 1955	Number of clinics per quarter			
		1st	2d	3d	4th
Child health	138	30	36	36	36
Tuberculosis screening	16	4	4	4	4
Tuberculosis consultation	96	24	24	24	24
Diabetes screening	240	60	60	60	60
Immunization	58	12	22	12	12
Dental hygiene	660	165	165	165	165
Totals	1,208	295	311	301	301

Exhibit 6. Standard cost data for nursing program, 1955

	Code and account	Variable costs		Annual fixed costs
		Work unit	Unit cost	
100	Personal service:			
	Salaries	Visit	\$4.23	\$9,000
290-628	Retirement contributions	Visit	.45	843
290-630	Workmen's compensation	Visit	.11	200
200	Equipment:			
	Automobiles	Visit	.30	290
300	Supplies and materials			
400	Other expenses:			
	Automobile expense	Visit	.46	455
	Variable cost per unit	Visit	\$5.55	
	Total fixed costs			\$10,788

Exhibit 7. Standard cost data for clinics, 1955

	Code and account	Variable costs		Annual fixed costs
		Work unit	Unit cost	
100	Personal service:			
	Salaries.....	Clinic.....	\$11.24	\$4,500
	Professional fees.....	Clinic.....	1.90	
290-628	Retirement contributions.....	Clinic.....	1.05	421
290-630	Workmen's compensation.....	Clinic.....	.25	100
200	Equipment:			
	Automobiles.....	Clinic.....	.24	
	Technical equipment.....	Clinic.....		283
300	Supplies and materials:			
	Clinic supplies.....	Clinic.....	1.04	
	X-ray supplies.....	Clinic.....	1.41	
400	Other expenses:			
	Automobile expenses.....	Clinic.....	.37	
	Variable cost per unit.....	Clinic.....	\$17.50	
	Total fixed costs.....			\$5,304

Performance budgeting almost forces the program supervisor to go through a complete planning cycle. He must judge how much work he expects his program will accomplish, what kind of work it will be, and how it will be done. Without such planning, there is little basis for forecasting costs or later for comparing planned operations with actual operations.

Three exhibits—6, 7, and 8—demonstrate the standard costs of a nursing visit, clinic session, and sanitary inspection.

In exhibit 6 we have taken all the costs that

were generated by the nursing program, obtained unit costs on a visit basis for those variable costs described previously, and found that a nursing visit costs \$5.55 in Rensselaer County. In addition, there are fixed costs of \$10,788 for the year 1955.

A standard cost does not reflect what ideally a nursing visit or sanitary inspection should be in Rensselaer County. It simply reflects what is true at that time. In late 1954 it cost the county \$8.65 to make a sanitary inspection.

The fact that unit costs differ is simply an

Exhibit 8. Standard cost data for sanitation activities, 1955

	Code and account	Variable costs		Annual fixed costs
		Work unit	Unit cost	
100	Personal service:			
	Salaries.....	Inspection.....	\$5.39	\$11,160
	Temporary services.....	Inspection.....	.17	
290-628	Retirement contributions.....	Inspection.....	.51	1,046
290-630	Workmen's compensation.....	Inspection.....	.12	248
200	Equipment:			
	Automobiles.....	Inspection.....	.35	290
	Technical equipment.....			75
300	Supplies and materials.....			
400	Other expenses:			
	Automobile expense.....	Inspection.....	.53	445
	Distribution:			
	Laboratory service.....	Inspection.....	1.58	
	Variable cost per unit.....	Inspection.....	\$8.65	
	Total fixed costs.....			\$13,264

Exhibit 9. Operating budget for calendar year 1955

Cost center	Variable costs			Fixed costs	Total costs
	Forecast work units	Allowance per unit	Total		
Nursing	17,315 visits	\$5.55	\$96,099	\$10,788	\$106,887
Clinics	1,208 clinics	17.50	21,139	5,304	26,443
Sanitation	5,845 inspections	8.65	50,568	13,264	68,832
Laboratory:					
Gross budget	40,000 tests	.711	28,440	19,402	47,842
Distribution to sanitation	-13,000 tests	(.711)	-9,243	-----	-9,243
Net budget	27,000 tests	.711	19,197	19,402	38,599
Social service					8,928
Maintenance					8,928
Administration					14,181
Totals			\$187,003	\$142,821	\$329,824

index of a different type of operation or a more efficient operation. You cannot say that because one standard cost is less than another it is therefore better. Costs simply reflect the fact that one service is different from another. If the services are supposed to be substantially the same, then there should be administrative and professional scrutiny to determine what the difference means. It might mean better service, or it might mean inefficiency, but its meaning, whatever it is, cannot be determined from the budget. Performance budgeting

spotlights the problem. For its solution, you still need trained professional and technical personnel.

Under performance budgeting, the operating budget for a calendar year might appear as tabulated in exhibit 9. Here, instead of listing needs for fuel, pencils, and salaries, you budget as you normally plan your program. The table illustrates a budget for various programs: how much work the Rensselaer County Health Department expected to do in 1955, how much each work unit would cost, the total variable cost,

Selected References

Readers wishing further enlightenment on the application of performance budgeting to health department accounting systems are referred to the following articles which Mr. Klepak has written:

- Performance Budgeting for Hospitals and Health Departments (published by Municipal Finance Officers Association of the United States and Canada, Accounting Publication Series No. 11-6, Chicago, June 1956).

- Financial Tools for Effective Hospital Administration (Hilleboe and James, co-authors; published in Hospitals, Journal of the American Hospital Association; part 1 in April 16, 1956, issue, pp. 50-51, 55, and part 2 in May 1, 1956, issue, pp. 36-40).

- Fiscal Research in Public Health (Hilleboe and James, co-authors; published in Journal of the

American Public Health Association, July 1955, pp. 906-914).

- Program Accounting Test of the Rensselaer County (N. Y.) Department of Health (published by the Temporary New York State Commission on the Fiscal Affairs of State Government, Albany, N. Y., 1955).

Other useful information on performance budgets may be found in "Performance Budgeting and Unit Cost Accounting for Governmental Units," another publication of the Municipal Finance Officers Association (Accounting Publication Series No. 11-2, Chicago, 1954) and in "Performance Budgeting: Selected References," a bibliography prepared by the United States Bureau of the Budget Library and issued in 1951.

Exhibit 10. Tuberculosis hospital summary performance

Cost center or department of the hospital	Budget estimate	Actual cash ex- penditures	Difference between amounts budgeted and spent (col. 1— col. 2)	Workload	
				Planned	Actual
(1)	(2)	(3)	(4)	(5)	
Outpatient department.....	\$63,431	\$64,174	-\$743	7,500 exams.....	8,492 exams.....
Inpatient care:					
Ward service.....	310,326	283,793	26,533	91,250 patient-days.....	88,782 patient-days.....
Ancillary professional ser- vice.....	40,335	45,392	-5,057		
Surgery.....	103,819	96,723	7,096	225 major operations.....	197 major operations.....
Laboratory.....	37,797	37,786	11	35,000 tests.....	37,152 tests.....
X-ray.....	22,963	25,781	-2,818	3,350 X-ray exams.....	3,439 X-ray exams.....
Food service.....	212,820	205,054	7,766	282,052 meals.....	267,774 meals.....
Laundry.....	40,123	40,112	11	418,600 pounds.....	407,280 pounds.....
Housekeeping.....	112,925	105,666	7,259		
Maintenance.....	107,216	105,757	1,459		
Power plant.....	76,678	74,917	1,761		
Administration.....	125,357	121,359	3,998		
Totals.....	\$1,253,790	\$1,206,514	\$47,276		

the fixed or overhead cost, and the total amount to be requested.

A performance budgeting system is coupled with a statistical and financial reporting system. No accounting or budgetary system is worth anything unless it provides useful information to management.

Values for Administration

An attempt to show the complete operations of a hospital over a year may be seen in exhibit 10. The hospital is Home Folks Tuberculosis Hospital, Oneonta, N. Y., where our division has also set up an experimental performance budget.

Actually, you can't show in one summary table, or on one piece of paper, the complete operations of a large organization and make them definitive and of great value. You would require more than that for an actual reporting system. The sample table is simply intended to illustrate the type of information you can get from performance budgeting. It will show the areas needing further scrutiny.

On the left, in column 1, we note that the outpatient department is authorized to spend \$63,431. It actually spent \$64,174. By subtracting column 2 from column 1 we see that the difference is \$743. That's as far as we go in traditional budgeting systems. But this type of summary report goes further. It shows how much work you said you were going to do.

The hospital planned 7,500 outpatient examinations, but the actual workload was almost 1,000 more. Therefore, by projecting the amount of work planned and the amount of work actually done in terms of the unit cost for a single outpatient examination, we show the planned cost in column 8 and the actual cost in column 9. Column 10 indicates that the hospital should have been able to spend \$6,211 more than budgeted for outpatient work because it performed approximately 1,000 more examinations than forecast. Therefore, column 11 shows the net result is not failure to live within the budget by \$743 but actually a net savings of \$5,468 because in fact the outpatient department did \$6,211 worth of additional work for only \$743.

report for the fiscal year ended March 31, 1955

Standard unit cost (variable)		Workload expressed in terms of cost (workload \times unit cost)		Savings or overspending caused by changes in workload (col. 9 - col. 8)	Savings or overspending beyond workload requirements (col. 3 + col. 10)	Cost center or department of the hospital
Original work units (6)	Expressed in patient-days (7)	Planned (col. 4 \times col. 6) (8)	Actual (col. 5 \times col. 6) (9)	(10)	(11)	
\$6.26	-----	\$46,951	\$53,162	\$6,211	\$5,468	Outpatient department.
2.69	\$2.69	245,652	239,010	-6,642	19,891 -5,057	Inpatient care: Ward service. Ancillary professional service.
206.05	.51	46,362	40,592	-5,770	1,326	Surgery.
.40	.16	14,173	15,044	871	882	Laboratory.
1.11	.04	3,714	3,812	98	-2,720	X-ray.
.54	1.84	168,010	145,348	-22,662	-14,896	Food service.
.07	.34	31,048	30,208	-840	-829	Laundry.
					7,259	Housekeeping.
					1,459	Maintenance.
					1,761	Power plant.
					3,998	Administration.
	\$5.58	\$555,910	\$527,176	-\$28,734	\$18,542	Totals.

Administrators of health programs undoubtedly are interested in the direct uses of the performance budget. Here, we simply itemize some of them.

For Expenditure Control

Continuous cost consciousness is developed at all levels. Variances from budget show up currently.

"Responsibility accounting" concept places responsibility for cost as well as program control on operating supervisors.

Fixed-variable concept points up how costs should relate to workload.

Use of standard costs encourages the setting of staff performance standards.

Planned and actual workload and costs are compared and analyzed currently.

High-cost operations are spotlighted for study on an administrative management basis.

For Budgeting

Data are available for policy decisions; for example, evaluation of boarding care as compared with institutional care.

Costs may be compared among units or institutions and private agencies, for example, private laundry service as compared with institution laundry service, or production of vaccines in commercial laboratory as compared with public laboratory.

Costs are related to accomplishments and objectives so that evaluation of use of funds is facilitated.

Standards, once they are developed, can be examined throughout the year. Once accepted, the budget process becomes one of making decisions as to extent of the program, for example, the number of patients to be hospitalized or the miles of road to be constructed. In this way, it is possible to even the budget examination process so as to reduce or eliminate the peak rush of budget making.

For Presentation

You can tell at a glance the cost of a program or activity and, in many cases, the cost of each unit.

The budget becomes more informative and understandable.

Insecticide Resistance Of *A. quadrimaculatus* In Bolivar County, Miss.

By WILLIS MATHIS, B.S., H. F. SCHOOF, Ph.D.,
KENNETH D. QUARTERMAN, B.S., M.P.H., and
RICHARD W. FAY, Ph.D

*The data represent the first detection of resistance in *Anopheles quadrimaculatus* to chlorinated hydrocarbon insecticides and initial establishment of anopheline resistance to dieldrin.*

• • •

DESPITE the widespread use of DDT residual applications for the eradication of malaria in the southeastern United States during the period 1946 to 1950, there has been no indication that *Anopheles quadrimaculatus* (Say) has developed resistance to this compound. Kruse and associates (1) reported that *A. quadrimaculatus* became less susceptible to larvicidal treatments of DDT in the Tennessee Valley Authority malaria control program, but later studies (2) indicated that factors other than resistance were responsible for the apparent lack of effectiveness of the control operations.

However, field studies in Bolivar County, Miss., now demonstrate that, while *A. quadrimaculatus* in that area is still susceptible to DDT, it is highly resistant to dieldrin, BHC, and chlordane.

The authors are all with the Communicable Disease Center of the Public Health Service. They are stationed in Savannah, Ga., with the Technical Development Laboratories where Mr. Quarterman is chief. Mr. Mathis and Dr. Fay are entomologists, and Dr. Schoof is chief of the Biology Section.

The first indication of resistance in this species was noted in field tests, employing the method of Fay and associates (3). In these tests an average 24-hour mortality of 15 percent was obtained when 62 adult mosquitoes (3 replicate tests) were exposed to paper treated by immersion in a 0.25 percent dieldrin-xylene solution.

To substantiate this apparent loss of susceptibility to dieldrin, further tests were conducted with paper treated by immersion in 0.25 percent and in 1.0 percent dieldrin solutions. DDT-treated surfaces also were assayed. The female mosquitoes used were collected from natural resting places at five widely separated locations in Bolivar County during June and July 1955 and held overnight with food and water before their exposure to chemical residues. The results of these tests clearly indicated that *A. quadrimaculatus* was highly resistant to dieldrin residues although quite susceptible to deposits of DDT (table 1).

Since the dosage of the toxicants per square foot was unknown in the foregoing tests, additional tests were run using the technique of Fay and associates (4) in which plywood panels were treated with known dosages of the toxicant. Four chemicals were evaluated: DDT at 200 mg./sq. ft., dieldrin at 25, 50, 100, and 200 mg./sq. ft., BHC at 50 mg./sq. ft., and chlordane at 100 mg./sq. ft. The exposure period was 30 minutes, except for the DDT tests in which 30-, 60-, and 120-minute periods were employed.

To compare the susceptibility of the Bolivar County *A. quadrimaculatus* with that of non-resistant *A. quadrimaculatus*, parallel tests were conducted at the Public Health Service Technical Development Laboratories, Savannah, Ga., with a laboratory-reared strain (TDL). The adult mosquitoes of the TDL strain were processed in the same manner as the Bolivar County adults. The plywood panels used in the tests were sprayed in quadruplicate sets at Savannah. After the treatment, two sets of panels of each dosage were tested at Savannah against the laboratory strain. Two sets of panels (one

Table 1. Percentage mortality in 24 hours of female *Anopheles quadrimaculatus* exposed for 45 minutes to dieldrin and DDT residues

Treatment	Number of replicates	Total females	Adjusted 24-hour mortality ¹ (percent)
Dieldrin, 0.25 percent	38	787	18
Dieldrin, 1 percent	4	79	6
DDT, 1 percent	38	821	96
Check	15	341	3

¹ Based on Abbott's formula.

tested, one untested) were then forwarded to Mississippi. A similar pair of panels was retained at Savannah.

From the results of the panel tests with residues aged 1 to 13 days, it is readily apparent that the Bolivar County strain is highly resistant to dieldrin (table 2). Deposits of 100 and 200 milligrams per square foot produced average mortalities of 5 percent or less for this strain, compared with the 98 percent mortality achieved for the TDL strain with 25 milligrams of dieldrin per square foot. The data likewise show that the Bolivar County strain has little susceptibility to BHC and chlordane at the dosages normally used for residual applications.

Although the 30-minute exposure to DDT resulted in low mortalities for both strains, these low rates are considered to reflect the length of the exposure period rather than resistance to the pesticide. In 1948, tests with the TDL strain at 30-minute exposures to 200 milligrams of DDT per square foot produced average mortalities of 44 percent (4). In the present tests with the Bolivar County strain, the mortality rates were 51 and 85 percent, respectively, following 60-minute and 120-minute exposures to replicate panels, each sprayed with 200 milligrams of DDT per square foot. Moreover, exposure to paper treated with 1-percent DDT produced an average mortality of 96 percent for the Bolivar County strain (table 1).

The development of resistance in this species to dieldrin, chlordane, and BHC apparently is due to the extensive use of these pesticides in agriculture and for the control of malaria mosquitoes. Bolivar County is largely agricultural with cotton the chief crop. Insect control on cotton requires repeated insecticidal applications, many of which are made by airplane dusting. According to the Bolivar County agricultural agent and the local pesticide companies, the insecticides used in 1955 in the order of the quantities dispersed were dieldrin, toxaphene,

Table 2. Percentage mortality in 24 hours of adult *Anopheles quadrimaculatus* from Bolivar County, Miss., and those of a laboratory strain exposed for 30 minutes to insecticidal deposits on plywood panels

Pesticide	Mg./sq. ft.	Strain	Replicates	Total females	Mortality (percent)
Dieldrin	25	{ Bolivar County ----- TDL -----	1 4	25 258	8 98
	100	{ Bolivar County ----- TDL -----	1 4	23 229	5 100
	200	{ Bolivar County ----- TDL -----	20 4	496 233	0 100
BHC (36 percent gamma isomer)	50	{ Bolivar County ----- TDL -----	10 4	244 213	3 167
Chlordane	100	{ Bolivar County ----- TDL -----	10 4	248 205	5 244
DDT	200	{ Bolivar County ----- TDL -----	20 4	485 223	3 53 4 50

¹ In one test the mortality was only 13 percent; in the remaining three it was 94, 100, 100.

² 1-day-old residues (2 replicates) gave 87 percent mortality.

³ Mortality for individual tests ranged from 13 to 95 percent.

⁴ 1-day-old residues gave a mortality of 25 percent; 13-day-old residues, a mortality of 83 percent.

endrin, DDT plus BHC, DDT, and aldrin. DDT generally is not used until August, whereas the other pesticides are employed as early as June. Presumably, the airplane and ground dusting techniques employed provide ample opportunity for treating both the larval and adult stages of the mosquito. In addition, Bolivar County has conducted a residual spray program for malaria control in rural areas since 1944. DDT and DDT-chlordane formulations have been used in this program, the latter since 1950.

The level of susceptibility to dieldrin was suggested in 1953, in Mississippi, when heavy dosage of this chemical (0.5 to 1 lb./acre) failed to provide control of anopheline larvae in rice fields (5) even though similar applications in landlocked ponds near Savannah, Ga., had been satisfactory (6). In the Savannah tests, however, the general mosquito population was only slightly affected by the test applications, whereas in Mississippi the dust treatment of cotton exposed both the adult and larval stages of the mosquitoes to the insecticides over considerable areas.

An attempt is now in progress to colonize the

Bolivar County strain so that it will be available for bioassay purposes.

REFERENCES

- (1) Kruse, C. F., Hawkins, W. B., and Ludvik, G. F.: Resistance of *Anopheles quadrimaculatus* to DDT in the Tennessee Valley. *J. Econ. Ent.* 45: 810 (1952).
- (2) Hawkins, W. B., and Hall, T. F.: The present status of resistance to DDT of *Anopheles quadrimaculatus* in the Tennessee Valley (abstract). *In Second Annual Meeting of the Entomological Society of America*. Washington, D. C., 1954, p. 40.
- (3) Fay, R. W., Kilpatrick, J. W., Crowell, R. L., and Quartermann, K. D.: A method for field detection of adult-mosquito resistance to DDT residues. *Bull. World Health Org.* 9: 345 (1953).
- (4) Fay, R. W., Baker, W. C., and Grainger, M. M.: Laboratory studies on the resistance of *Anopheles quadrimaculatus* to DDT and other insecticides. *J. Nat. Malaria Soc.* 8: 137 (1949).
- (5) Mathis, W., Pickett, V. B., and Miller, W. O.: Chemical control of rice field mosquitoes in Mississippi. *Pub. Health Rep.* 69: 803-807 (1954).
- (6) Mathis, W., and Quartermann, K. D.: Field investigations on the use of several chlorinated hydrocarbons as mosquito larvicides. *Am. J. Trop. Med. & Hyg.* 2: 318-324 (1953).

Army Posts Fluoridate Water Supplies

There are 21 Army posts in the United States, Alaska, Hawaii, and Puerto Rico which now fluoridate their water supplies, according to recent information made available by the Army Surgeon General.

Requests for fluoridation are submitted to the Surgeon General and are accompanied by a report on the natural fluoride content of the water on the post and a statement of the number of persons to benefit from the procedure.

The age of the population at an installation is one of the criteria for determining the priority for setting up the fluoridation process. A census must be taken of the number of persons under 12 years of age, the number between 12 and 16, and those between 16 and 20 years living on the installation and reported with the application for fluoridation.

The Committee on Dentistry of the National Research Council has supported fluoridation of water supply for use on military posts whenever feasible and especially where there is a child population in residence. The Army Medical Service approved the fluoridation of drinking water at Army installations in July 1954.

The Queens Rehabilitation Program is designed to provide total rehabilitation for children handicapped with orthopedic, neuromuscular, or cardiac disabilities through enlisting the cooperation, and coordinating the activities, of professional groups, interested agencies, organizations, and individuals in the community.

Queens Rehabilitation Program for Handicapped Children

By LEONARD W. MAYO, S.Sc.D., and ROBERT M. WEBB, M.S.

NO MATTER what the size of a community, its future rests on the well-being of each of its members. Among the members of every community are those who are economically deprived, emotionally or mentally ill, or physically handicapped. These impairments are often such that they interfere, to a greater or lesser degree, with adequate functioning on the part of the individual in the community's

Mr. Mayo is director of the Association for the Aid of Crippled Children, New York City, an agency devoted to the interests of handicapped children and youth. He has had long experience with child welfare programs. At one time a high school teacher, a director of athletics, and the chief parole officer of a training school, he is, in addition to numerous civic and national posts, the honorary president of the International Union for Child Welfare and on the board of the Child Welfare League of America.

Mr. Webb has been director of the Queens Rehabilitation Program, Jamaica, N. Y., since its inception in 1954. His earlier career included posts with the Department of Welfare and the Domestic Relations Court, New York City, the Queensboro Council for Social Welfare, Jamaica, and the Stamford (Conn.) Community Council.

enterprises, whether these enterprises are learning, making profitable use of leisure time, or earning a living.

In order to sharpen the focus from a broad and hazy look at the variety of differences in communities and in individuals, let us adjust our lens to pick out one physically handicapped child in a large metropolitan area and try to discover what may be done to help him through a more effective organization of the community.

Seen by a casual observer, Harry appears to be a pretty normal boy. His eyes are alert and clear, and he looks intelligent; his shoulders are broad and sturdy; and his appearance is neat, at least not any dirtier than the usual accumulation which 12-year-olds can assemble without obvious effort. But if you watched him walk, you would not notice the upper portion of his body because his right leg has been amputated at the knee, and he uses crutches.

Understanding for Harry

People who see Harry on the street for the first time usually react with pity. Sometimes they offer to help him across the street or give him a seat on a crowded bus. Some turn their eyes away so as not to embarrass him. Sometimes his contemporaries show a different reac-

tion: "Hello, Crip. Bet you can't do this." Whatever their reaction, it is frequently not one of acceptance, understanding, or a desire to help. As a matter of fact, most people, adults as well as children, do not know how to help. They may remember Harry when they are asked for money for Easter Seals or the March of Dimes as a kind of payment to the gods for their own healthy bodies, but they are not very likely to get Harry into their clubs at church, their activities at school, or their outings at the beach unless they do so in a way that makes him feel "special" and "different."

What is Harry really like? How does his family feel about him? How does he feel about himself? What does he need to help make him whole? Can he find this help in his community? Taking everything into account, what can his neighbors and the community do in a practical and constructive way to help him make the grade and, at the same time, add to his own self-respect?

In Harry's community, the Borough of Queens in New York City, there is a demonstration program set up to help answer these questions. Sponsored and financed initially by the Association for the Aid of Crippled Children, it is called the Queens Rehabilitation Program. Part of the program is a diagnostic and evaluation center, called a division, in one of the public hospitals in the borough. Harry's physician learned of this, and sent him there to be thoroughly studied so that recommendations could be made for his rehabilitation—emotional, mental, and spiritual, as well as physical.

Harry and his mother came to the diagnostic and evaluation division of the Queens Rehabilitation Program where an appointment had been made. Harry did not have to wait in a cheerless room for a long time. He waited a while because it is a busy place, but the room is attractive, and there are magazines and books to look at. The physician saw Harry and his mother in a private examination room. When Harry had been given a thorough medical examination, a social worker talked to the mother and learned about the home, the other children in the family, and their relations with each other, the father and his job and earning capacity; the mother's feeling about Harry ("Harry's

a good boy, but he broods an awful lot") and her attitude toward his disability ("Of course, I love him, but, well, it's hard to know how to treat him like the others. His crutches and all make him different").

That same day, if there was time and Harry was not too tired, or maybe another day by appointment, Harry saw a physical therapist who made an evaluation of his muscular development, his ability to walk, to climb stairs, to handle his crutches, and the strengths and weaknesses of his limbs. An occupational therapist saw him, too, and tested his coordination, his ability to dress and undress, and his capacity for the many activities of daily living. A speech therapist tested his facility with words, and a psychologist gave Harry a battery of tests which showed his intellectual capacity, his learning ability, and his deeper attitudes and feelings about himself and his relation to other people. A medical specialist in orthopedics took a careful look at his leg to determine whether it was possible or advisable to use some appliance other than crutches to help him walk.

Finally, after all these specialists had an opportunity to become acquainted with Harry and his family, and after they had made a thorough evaluation of him and his needs from their own points of view and consulted with each other to check their findings; after all available information from his school, his church, his family, and other agencies which have had to do with him in the past was correlated—the team got together and put all the pieces into one comprehensive and total evaluation of Harry as a whole person. What did they find?

Harry's is a relatively simple story. He set off one Sunday, ostensibly for church, with some change in his pocket for the collection but landed instead in a movie theater. Timing himself so that he would get home when he was expected, he left the theater to cross the street to a bus stop. As he ran from behind a parked car, he stepped into the path of an automobile, leaving no time for the driver to stop. Amputation saved Harry's life but cost him his leg.

Before the accident Harry had not been happy at school. He attended sporadically, using any available excuse to stay away, truanting with increasing frequency despite punish-

ment. Examinations showed that his hearing was defective, but this was not known until after the accident. His brothers and sisters, although not as well endowed intellectually, did better at school and were favored by their parents for this reason. Harry's father resorted to severe physical punishment to deal with him, and this, combined with the obvious preference shown by his mother for the other children, made the boy feel rejected and bitter. He was ready to use his disability as a means of getting even with his parents and as a means of avoiding school legitimately. Yet, at the same time he thought of his amputation as a punishment for his truancy and particularly for his deceit in not going to church the day he was injured.

The Rehabilitation Program

What to do for Harry? A useful and simple solution would be to fit him with a prosthetic appliance so that he could walk without crutches and look very much like other boys.

Simple? Yes, except for the painstaking patience Harry would need to learn to walk again, to go through with the fittings and adjustments, and to get accustomed to the artificial leg. Above all, Harry had to want to walk and be willing to give up the newly found means of getting attention and favored treatment his crutches had given him.

Another easy matter would be to supply him with a hearing aid so that he could follow the teacher's instructions and understand the work in class and thus be able to put his intelligence to use. Easy? Yes, except for the adjustment to the hearing device and the reshaping of a boy's whole lifetime of feelings about school and other people.

And what about Harry—not merely his physical problems, as important as they were—but Harry as a person? A pattern of truancy is not easy to change. A fear of physical punishment for any infraction of rules is not readily overcome. The deep guilt which Harry felt because "God punished him" by destroying his



leg is difficult to clear up. If it takes time to learn to use an artificial leg and a hearing aid, how much more time and skill are needed to set straight the deep emotional disabilities that had ridden him even longer, and that his poor hearing and his traumatic experience served to aggravate?

The diagnostic and evaluation division of the Queens Rehabilitation Program sent its recommendations to Harry's physician, who arranged to get the prosthetic appliance and the hearing aid. At the physician's request, the physical therapist at the division helped to train Harry in the use of his new leg, and the speech therapist taught him to use his new "ears." Their work was carefully checked as they went along by competent medical men—Harry's own physician and specialists. But Harry's physician was at a loss to know where to get the help that the recommendations made it obvious Harry needed. He fully accepted the recommendation for guidance for Harry and his parents, but where could he turn to get the expert advice?

The physician understood that the Queens Rehabilitation Program included services other than those of the diagnostic and evaluation division, for a friend of his was serving on a committee of the program which concerned itself with the development of such services as Harry and many other handicapped children need.

It is the aim of the program to locate the children who need service, to acquaint the agencies, hospitals, and other facilities with their needs, and to stimulate such organizations to provide the care which the children require. Harry's physician is one of hundreds of Queens citizens who take an active part in this endeavor, and he knows that Harry's case is not unique. Although it was an accident that caused the boy to lose his leg, there are children suffering from poliomyelitis, cerebral palsy, muscular dystrophy, and cardiac conditions, and children who are congenitally malformed or who have suffered a birth injury. Many need help, and it is for all, rather than for any one group exclusively, that the Queens Rehabilitation Program exists. The program is planned to demonstrate that, through community organization methods, it is possible to help the handicapped children of a community with the services that exist or can be developed, and

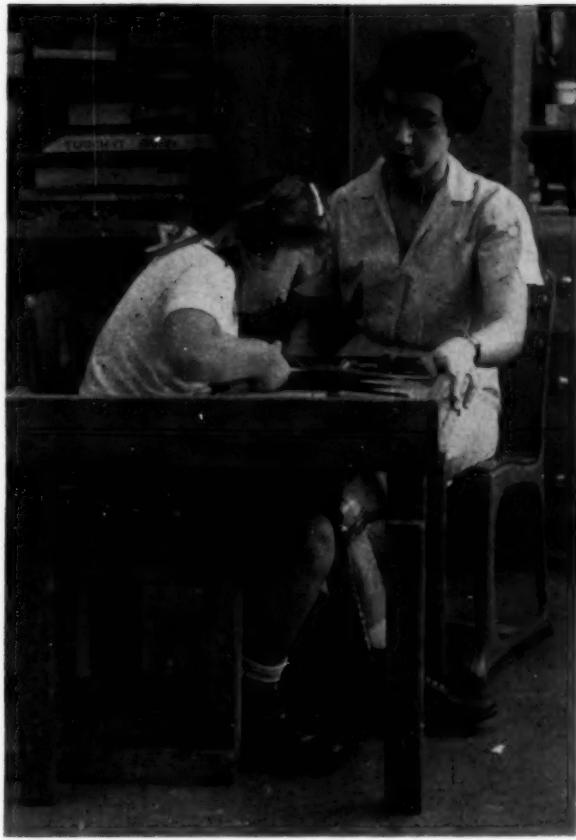
that it is not always necessary or desirable to construct a building in which to house a rehabilitation center.

How is this being accomplished? What are the methods and tools of community organization, and how can Harry and others be better served because of them? As those experienced in the process will know, community organization is neither coercion nor manipulation, nor does it consist of imposing a pattern upon a community according to a preconceived plan, whether or not the community wants it. Community organization provides for bringing the principal elements of a community together under skillful leadership to face the most important things that need to be done in any field, deciding how they can be accomplished, and then carrying out a plan of action. In the Queens Rehabilitation Program, these things were done in the following way.

Basics of Community Organization

First there was an idea. In this instance, the idea was that a better job could be done in finding and treating the handicapped children and youth of the Borough of Queens. The idea had to be tested against the experience of responsible persons. It was discussed with public officials, department heads, hospital administrators, and experts in rehabilitation. When it seemed to be correct, according to the advice received from these persons, the next step was to get together a representative group of Queens residents and lay the idea before them for their reactions and their suggestions. They were the people who knew their community and might be expected to be able to give a correct evaluation of their community's willingness and readiness to accept a demonstration such as the one proposed, to work with it, and to cooperate in its aims.

Here was the place where a fundamental concept of community organization was used, namely, that no program may be expected to succeed unless the responsible leadership of the community is behind it. The group called together was representative in the statistical rather than the sociopolitical sense, as Alexander and McCann (1) make the distinction. That is to say, there were people from educa-



tion, government, medicine, social work, and civic and fraternal work—not elected by the organizations to which they belonged, and not officially speaking for those organizations. For example, the president of the medical society expressed the general views of organized medicine, but he was not delegated by the society for the purpose of expressing its majority opinion on a specific issue.

The group, designated later as a planning and coordinating committee, discussed the plans and proposals which had been submitted to it by the Association for the Aid of Crippled Children and suggested some amendments.

After several meetings, there was agreement that a demonstration program should be undertaken in Queens, and that it should have five main areas of concern: case finding, care and treatment, recruitment and training of professional personnel, public education, and research. In order to work out the details of methodology, separate subcommittees were set up. Again, careful selection was made to assure the participation of as representative a group of people

as possible in order to secure the advice and guidance of the people most closely concerned with the work with handicapped children and to make sure that these people took an active partnership role in the development of the program. It was considered important that its growth should be along lines which they chose as important, and that, as it progressed, it should be their program and not one imposed on them or which they were "talked into" supporting. It is a simple but important principle of community organization that sound progress is achieved only when the community itself understands, supports, and is a part of that progress. It is frequently easier and faster to raise funds for the construction of a building than to work out other and perhaps better ways of serving people, but accomplishments are more likely to be permanent when they are planned and carried out jointly even though it may take three or four times as long to achieve results.

As an example: it is very important to ascertain certain facts about a community before try-

ing to help solve a problem. One way to obtain facts is to have a survey made by experts from outside the community. These experts, having in mind an ideal, can quite quickly examine the community to see how closely it approaches perfection; then, they can, again with a considerable amount of speed and with great accuracy, record the comparison between present fact and ideal goal, and, finally, they can draw conclusions and make recommendations based upon their expert knowledge. In certain circumstances, and to meet the needs of certain communities, this kind of survey is useful and valuable. But sometimes the experts leave the community nothing more than a list of improvements which it should make to bring itself closer to the ideal. What happens then? The reaction, more often thought than stated, is very likely to be: "So these experts have examined us under their microscope and have found out that we ought to do thus and so. Why should they tell us how to run our town? They simply do not understand our situation. If they think such and such should be done, let them do it. We like our town as it is, and no imported expert can tell us otherwise."

But there is another way to conduct a survey, or in any event there are certain things a community can and should do before the experts come in. It takes longer and is more work for all concerned, but it is also more likely to produce lasting results; that is, the community can set up committees of its own citizens. They need not be experts, but they must be interested and intelligent individuals with a broad outlook. They should examine their community and find out the important facts about it. Having found them, they should study and decide whether or not the facts indicate correction. They should spend a lot of time at this job, and they may make some false starts. They should have professional assistance; this need not be an expert in the usual sense but a community organization worker who can provide the technical knowledge and act as the spark plug and generator for their machine. When their survey is complete, these citizens can make their recommendations to their fellow townsmen, and then the reaction of the community may well be: "We have looked at our town, and we find

that we need thus and so. We know that we need it, and we want to do something about it. We intend to see that something is done, and we do not intend to relax until it is done."

In Queens many people have been involved in planning ways to provide better service for the handicapped children in the community. Committees in which physicians, ministers, nurses, social workers, businessmen, housewives, and health educators worked and talked together have met over a period of years. Some of them were set up for specific purposes of relatively short term—for example, to plan the establishment of the diagnostic and evaluation division: Where should it be? What kind of a staff should it have? What should be the job of the various members of its staff? What children should it serve? How should they be served? Others were formed along more general lines—for instance, to work for the integration of service to handicapped children within the framework of existing casework and group work agencies: What services existed in Queens? How far were they serving handicapped children? Were they prepared to go further? What major gaps in service existed? How much understanding was there on the part of the staffs and lay leadership of those agencies as to what is meant by total rehabilitation? What was the best way to get more understanding?

As in the example given above of two ways to conduct a factfinding survey, there was a conscious choice made in Queens between two ways of serving handicapped children. It would have been possible to conduct a fund-raising campaign for a building to house treatment facilities, to employ expert campaigners, and to gather the necessary money. A new service, admittedly needed, would then have been superimposed on the existing community resources, without relation to any of them or coordination with their purposes. Instead of taking that more usual direction, those who planned the Queens Rehabilitation Program decided to spend time, effort, and money in pulling together the common interests of many people and organizations. By developing a general concern, providing a means for getting real understanding, and offering a channel for cooperative



effort, it was believed that the results would be more permanent and more securely based.

What has all this done for Harry? His physician knows that the boy needed the services of a skilled caseworker and that his physical adjustment would not progress very far until he and his parents were on better terms. The service which Harry needs is now available to him through a family casework agency, and he and his parents are consulting regularly with a staff member there. It was harder to get Harry's mother to accept the need for that than it was to make her understand the need for an artificial limb, but progress is being made. Similarly, it is harder to work with a group of agencies to the end that they develop services for themselves than it would have been to say, "You need a rehabilitation center. We will build it for you."

Working together for an aim which the community wants and knows it wants and needs, mobilizing all available resources of mind and heart and strength for a mutually understood goal—these are community organization methods. They are applicable, with suitable adjustments, anywhere, for any community, under public as well as private auspices.

Have the results justified this approach?

Tangible and Intangible Results

Thus far the results have been of two kinds. One is tangible and concrete: A casework agency has inaugurated a special program for handicapped children integrated with its regular service to families and children.

A group-work agency has developed an experimental project to work with handicapped girls as a part of its general program. A special course for teachers who have handicapped children in their regular classes has been set up. School guidance counselors have been made acquainted with careers in health work and the variety of skills and interests which their pupils may develop in order to prepare for such careers. Two hundred children have been evaluated at the diagnostic and evaluation division in the Queens Hospital Center; many of them have been given muscle reeducation, have had appliances fitted, have been guided in the activities of daily living, or have had counseling service. Two other hospitals have also set up the beginnings of a treatment service.

The other kind of result is intangible and not capable of scientific measurement. For example, many people are more aware of the fact that handicapped children are children—that youngsters like Harry are not pathetic labora-

tory specimens of deformity but are children with feelings, reactions, emotions, and sensitivity. By the simple process of working together in committees on common problems, physicians, social workers, and other specialists have come to a greater acceptance of each other's skills; representatives of various groups have come to see that they have mutual concerns; people in different walks of life have arrived at an understanding of what each has to contribute to the

other and of what all have to give to the total community. The accomplishments of the program are their accomplishments, not the achievements of outsiders.

REFERENCE

- (1) Alexander, C. A., and McCann, C.: The concept of representativeness in community organization. *J. Nat. A. Social Workers* 1: 51, January 1956.

Surgeon General Burney



detail from the Public Health Service from July 1, 1945, to August 1954. For the next 2 years he was Assistant Surgeon General and deputy chief of the Bureau of State Services of the Public Health Service. He had been assistant chief of the Division of State Relations in 1943 and 1944.

Dr. Burney established the first mobile venereal disease clinic service in Brunswick, Ga., in the late thirties. In 1945, on detail to the Navy for 5 months, he was sent overseas by the War Shipping Administration to devise effective control measures for communicable diseases, especially the venereal diseases, in various Mediterranean ports. On returning to the United States, he became director of the former Public Health Service District 4 (now a part of Region 7) at New Orleans.

Dr. Burney joined the Regular Corps of the Public Health Service in 1932 after completing his internship at the United States Marine Hospital in Chicago in 1931 and subsequently receiving an M. S. degree in public health at the Johns Hopkins University School of Public Health, which he attended on a Rockefeller fellowship in 1931 and 1932. He received his doctorate in medicine from Butler University and the bachelor of science degree from Indiana University.

Dr. Burney is a past president of the Association of State and Territorial Health Officers and has been an active member and officer of various State and national medical and public health associations. He was born at Burney, Ind., on December 31, 1906.

tuberculosis:

hospital or home care

Papers selected from the joint annual meetings
of the National Tuberculosis Association, American
Trudeau Society, and National Conference of
Tuberculosis Workers, New York City, May 20-25, 1956

THE IMPORTANT POTENTIAL source of new tuberculosis infection is the person with tuberculosis who is outside the control of a tuberculosis service. Even though progress in saving lives has overshadowed the tragedy of tuberculosis, progress in preventing the disease has been relatively slow: While mortality has declined, it appears that the decline in morbidity has not kept pace.

It seems that the heralded drugs—isoniazid, streptomycin, and para-aminosalicylic acid—may not kill all the tubercle bacilli in patients, even though these drugs effectively inhibit multiplication of the micro-organisms.

With the new drugs, and with infectiousness capable of being brought under control in a relatively short time, the stay in the hospital is shortened for many a patient. But even then, he must continue treatment at home. Without

utmost caution and continued drug treatment for a year or more, the disease may flare up, the patient becomes infectious again, and the circle of infection is set in motion once more.

Of major concern in tuberculosis control programs, the nonhospitalized patient is the subject of the Public Health Service survey reported by Dr. Robert J. Anderson at a special session of the National Tuberculosis Association annual conference, New York City, May 20-25, 1956. Dr. Anderson's report is reproduced on the following pages along with other selections from the conference: a paper on the social significance of chronic illness with a case history of home care for a tuberculosis patient by Lucille Smith, abridgments of papers by Ruth B. Taylor and Dr. Sabine M. Holin and associates, and abstracts of 10 papers selected for their interest to health department workers.

The Nonhospitalized Tuberculosis Patient

—Program Implications—

By ROBERT J. ANDERSON, M.D., HERBERT I. SAUER, VERA SMITH,
and DORIS E. ROBERTS, B.S., R.N.

DESPITE the continuing decline in the mortality and new case rates from tuberculosis, a considerable problem still remains in the detection, treatment, and rehabilitation of the tuberculosis patient. The resistant nature of the problem is made manifest by the relatively slow decline in the morbidity rate. Consequently, the problem of treating and following active cases in the population is a stubborn challenge to all public health workers.

With the advent of the new antituberculosis drugs, the need for prolonged stay in hospitals has been diminished, and care of tuberculosis patients at home has become increasingly accepted. In the last few years there has been great concern about these patients. Several reasons underlie this concern: Many areas now have vacant tuberculosis beds which could be

used effectively for the treatment of tuberculosis; drugs are now available which may be given effectively to patients at home; and the need for intensive supervision of cases is more fully recognized.

Finding cases and supervising them once they are found are the two main activities in tuberculosis control. Finding cases is achieved by searching for the unknown cases not yet discovered by X-ray surveys or other means, for the unreported cases which have been diagnosed but are not as yet reported to the health department, and for the known cases which have become lost or are not followed because of lack of staff or other reasons.

Even today, when we are concentrating our attention upon known cases, we must recognize the importance of those which are unknown and unreported.

Provisional reports for 1955 show a total of approximately 100,000 newly reported cases for the continental United States alone, of which more than 75,000 were active or probably active, a rate of 46 cases per 100,000 population (fig. 1). The slow decline in newly reported cases of about 4 percent a year thus continues. Moreover, tuberculosis deaths show the smallest percentage decline since the introduction of chemotherapy almost a decade ago.

While the concern of this presentation is with known cases outside hospitals, we remain aware that constantly a large number of new cases is being added to the total load.

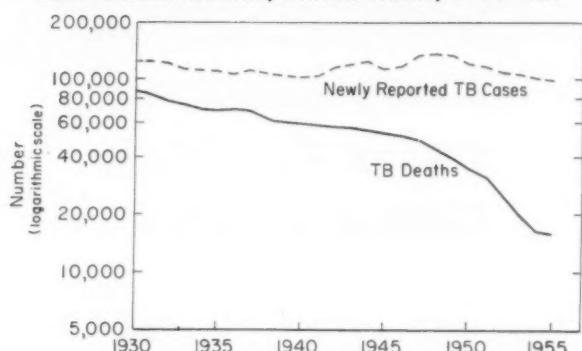
Past observations and empirical judgments form the basis for much of our present tuberculosis control programs. New facts and meas-

Dr. Anderson, assistant chief for operational research, Division of Special Health Services, Public Health Service, delivered this paper at the annual National Tuberculosis Association meeting, May 24, 1956. The other authors are all with the Tuberculosis Program, Division of Special Health Services, Public Health Service. Mr. Sauer is a statistician, Mrs. Smith, a health program adviser, and Miss Roberts is chief nursing consultant.

Important contributions to the study were made by Dr. Paul A. Pamplona, Genevieve S. Jones, Gladys M. Ray, Zella Bryant, Ruth B. Taylor, Dorothy E. Rogers, Sara B. Pearson, and Jewel G. Wyman, all with the Tuberculosis Program at the time.

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Figure 1. Newly reported tuberculosis cases and tuberculosis deaths, United States, 1930-55.



urable characteristics of tuberculosis patients give us the foundation for realistic programs for the future in supervising cases after they are found. The Tuberculosis Program of the Public Health Service has been active in the past 2 years in a study of nonhospitalized tuberculosis cases known to health departments in 37 areas, representing the Nation, with a total population of almost 7 million. The latest information on these cases was obtained from physicians, clinics, hospitals, social workers, and public health nurses. Some of the information derived from this study supports our beliefs, and some of it demands a change in our concepts and approaches. A paper describing some of the general findings and the methodology of the study was published in February 1956 (1).

For example, it has been said that the number of known tuberculosis cases is increasing. Some have speculated that home care has replaced hospital care. Our study does not support these views. Undoubtedly, caseloads in some health departments are heavier because they are now supervising significant inactive cases for longer periods of time. But, in every area, the study shows that there were fewer known clinically active cases than had been estimated previously. This agrees with case register reports from 30 States, which show that between January 1, 1953, and January 1, 1955, there was a 6 percent decline in the number of hospitalized cases whereas there had been a 12 percent decline in the number of active cases at home. In other words, the number of active

cases at home declined twice as rapidly as the number hospitalized.

While our study sought, in particular, information about active cases at home, we had to review several times as many cases which were carried by the local health departments as significant for public health supervision. Cases selected for the study consisted of all cases classified as clinically active and presumably active and also all cases for which drug therapy is prescribed even though many drug cases are classified as inactive, arrested, or probably inactive. The activity classification of tuberculosis cases at home is shown in the following table.

Classification	Number	Percent
Active	1,896	60
Presumably active	376	12
Inactive with drug therapy	887	28
Total	3,159	100

Those cases called "presumably active" consist chiefly of patients whose latest clinical diagnosis was "active" or "probably active" tuberculosis although this diagnosis was at least a year old at the time of the study. Also in the "presumably active" group are all cases classified as "arrested with positive bacteriological status." Technically, the 1950 Diagnostic Standards of the American Trudeau Society stated that arrested cases may, under specified conditions, have positive bacteriological findings. Actually, physicians seldom classified positive cases as arrested. In this study of more than 3,000 cases, only 70 cases were listed as arrested with positive bacteriological findings. Since these cases are of public health importance, they were included in this study. Incidentally, the small number of such cases found indicates the wisdom of eliminating this category from diagnostic standards.

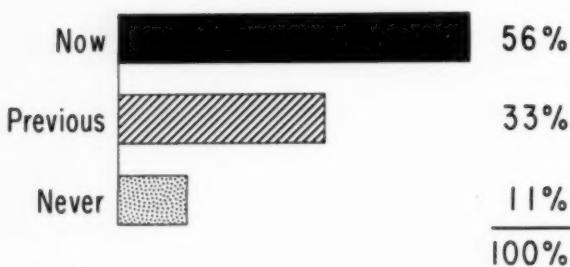
History of Hospitalization

We have all wondered to what extent home care is replacing hospitalization or what proportion of tuberculosis patients have ever been hospitalized. Our study provides factual answers to these questions derived from the ex-

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periences of more than 7,000 patients in the 37 areas. Several years ago (*2a*), we found that less than half of the known cases were hospitalized. This study reveals that more than half, or 56 percent, are hospitalized as of the census date and that most of the patients at home today have a history of hospitalization. Eighty-nine percent of the tuberculosis patients either were hospitalized or had been hospitalized (fig. 2). Thus, we are unable to demonstrate any marked trend toward substituting home care for hospitalization. We do recognize a very marked trend toward supplementing hospitalization with a substantial amount of chemotherapy at home.

Figure 2. Hospitalization history of tuberculosis cases.

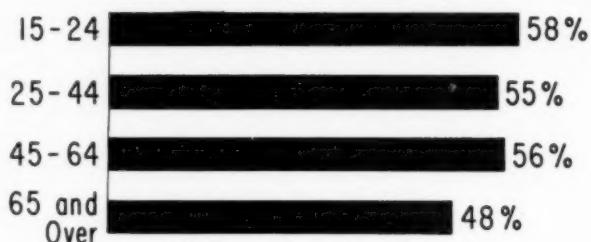


While 56 percent of the known significant cases were hospitalized as of the census date, there was some variation from area to area, with the large cities having 61 percent of their patients hospitalized, and the nonmetropolitan areas, largely rural, having only 46 percent hospitalized. These percentages are shown:

	Percent
Cities 200,000 population and over-----	61
Metropolitan areas exclusive of large cities-----	52
Nonmetropolitan areas, largely rural-----	46

Thus, the areas with the fewest health department and clinical facilities have the lowest percentage of hospitalized patients and the highest percentage at home. An identical relationship exists for the proportion of patients who have been hospitalized at some time in the past: Large cities have the highest proportion ever hospitalized and rural areas the lowest. For each area except four small areas, three-quarters or more of the known patients either

Figure 3. Percentage of tuberculosis cases hospitalized, by age group.



were or had been hospitalized. This proportion of cases hospitalized has many interesting ramifications pertinent to tuberculosis control.

Age, Sex, and Race

Many tuberculosis hospital directors have said that the average age of their patients is increasing and that they now have many more older patients than in former years. Our study showed that, of those patients 65 years of age and over, a higher proportion are at home than of any other age group (fig. 3.) This difference by age was found to exist for women as well as for men and for rural areas as well as for urban. Because of the drop in newly reported cases in young people, the higher percentage of younger people hospitalized, and the higher proportion of reported cases in older age groups, we predict that the number of younger adults hospitalized will decline and that the number of older adults hospitalized will remain stationary, or in some instances, even increase.

Analysis of newly reported cases and deaths from tuberculosis have shown that more men have far advanced disease than do women and that the male death rate is more than twice the female death rate. With this knowledge, it was encouraging to find that a higher proportion of men than women are hospitalized (fig. 4). While reasonable success has been

Figure 4. Percentage of tuberculosis cases hospitalized, by sex.



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achieved in getting men hospitalized, there has been less success in keeping them in the hospital. That is, of the men at home who had been hospitalized, almost half had been discharged against medical advice whereas of the women, less than 40 percent had been so discharged.

Nonwhite patients had a higher proportion of far advanced disease at the time of first report and also a higher death rate than white patients. Thus, it is also encouraging to learn that a higher proportion of nonwhite patients are hospitalized. Actually, only 51 percent of the white patients were hospitalized as of the census date while 64 percent of the nonwhite patients were hospitalized (fig. 5). This may be due in part to the fact that nonwhite patients, especially in the southern areas of the country, showed a slightly lower rate of leaving against medical advice than did white patients.

Figure 5. Percentage of tuberculosis cases hospitalized, by race.



These observations indicate that though we have tried to adapt hospitalization practices to meet the needs required by sex and race, we have not met needs in respect to age.

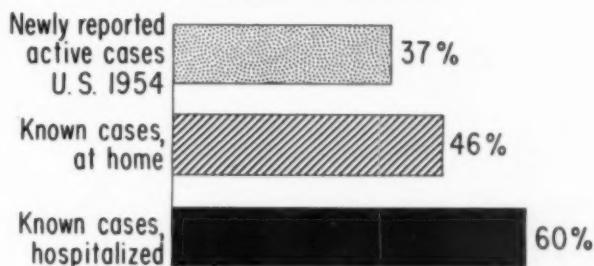
Diseases and Conditions

Tuberculosis patients at home had a wide range of diseases and conditions coexisting with tuberculosis. Slightly more than one-fourth of the patients had one or more coexisting diseases. In 6 percent, alcoholism coexisted with tuberculosis. Approximately 3 percent were recognized as having diabetes and a similar proportion as having cardiovascular disease.

Extent of Disease

Of the nonhospitalized cases in which the extent of disease was specified, almost half were far advanced as compared with 60 percent

Figure 6. Percentage of tuberculosis cases with far advanced disease.

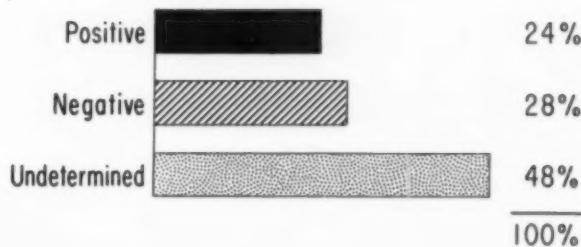


far advanced on admission among the hospitalized cases (fig. 6). Each of these groups contains a substantially higher proportion of far advanced cases than the newly reported active cases. This we would expect because of the usual prompt response of minimal cases to therapy. The extent of disease was about the same for cases from rural areas, as compared with those from the large cities and suburbs.

Bacteriological Status

The seriousness of the tuberculosis problem is reflected by the infectiousness, or bacteriological status, of the cases. Based upon the best information available to health departments, clinics, and public health nurses supervising these cases, the item of first note is the fact that no bacteriological examinations were available for half of the active cases within the 6 months preceding the census date even though a very substantial proportion of these were positive when last examined (fig. 7). In addition, one-fourth of the active and presumably active cases were bacteriologically positive within 6 months of the study date. Comparatively few of the

Figure 7. Bacteriological status in last 6 months, active cases at home.



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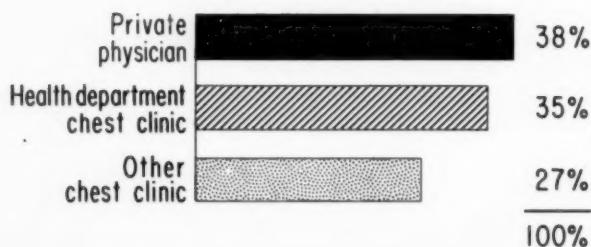
persons with unknown bacteriological status were newly reported cases; almost half had been known to the health department for 3 years or more. A slightly higher proportion of the positive sputum cases had been hospitalized than had the negative cases.

Supervision and Treatment

Several years ago (*2b*), we pointed out that many health departments do not maintain current information about the supervision and activity classification of their cases. In this study, of those classified on the case register as clinically active cases at home, 35 to 40 percent were found to be dead, hospitalized, moved away, lost, or no longer active. Therefore, they were removed from the group of "known active cases at home." Then, a check on the activity of cases classified as "activity undetermined" and a search for cases from other records resulted in adding almost 10 percent to the "known active cases at home." We reassert that health departments frequently do not know about the current supervision and activity of their cases and do not maintain adequate case registers. This deficiency might well be considered by those who are contemplating the addition of a register for tuberculin reactors.

Even though a substantial portion of the cases were thus excluded, the remaining active and presumably active cases were not all under medical supervision. In fact, almost one-fourth were under no known medical supervision. Those under supervision were about equally divided between private physicians, health department clinics, and all other sources of supervision (fig. 8).

Figure 8. Medical supervision of active cases with supervision known.



In spite of this inadequate knowledge about tuberculosis patients, health departments have made progress in the supervision of cases. Large numbers of inactive and probably inactive as well as active cases are receiving drug therapy at home, and the administering of such treatment programs requires much more work per patient than formerly. Even though the number of active cases at home has decreased somewhat, health departments are generally expending more effort on tuberculosis control. In fact, one large city health department reports that one-third of all nursing visits were made for tuberculosis. This is understandable when one recognizes that streptomycin was given, either alone or in combination with other drugs, to two-thirds of all the patients on drug therapy.

Drug therapy was prescribed for less than half of the active and presumably active cases at home. In view of the widespread interest in giving drug therapy to patients at home, we hoped that this proportion would be much larger. The low ratio results from several factors: First, some physicians so firmly believe that active tuberculosis cases must be in a hospital that they will not prescribe drugs to un-hospitalized patients. Second, almost one-fourth of the active and presumably active cases are not under medical supervision. Third, in some areas, medical societies, health departments, and tuberculosis associations have not developed treatment services for patients who are unable to pay for private care.

As might be expected, the recent hospital discharges showed the highest proportion of patients who had drug therapy prescribed while those discharged for a longer period of time and those never hospitalized showed lower proportions.

We have used the phrase "drug therapy prescribed" quite deliberately because giving a prescription is not necessarily synonymous with the patient's actually taking the medicine. In fact, available information gave evidence that, of the patients with drug therapy prescribed, 12 percent were not fully following their prescriptions.

The active cases with drugs prescribed also

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generally had bed rest recommended while, of those without drugs prescribed, less than half had bed rest recommended. The inactive and arrested cases with drug therapy were more likely to have rest prescribed than were the active cases without drug therapy.

Nursing Service

Our study confirms that there are more medical and public health nursing services available in cities and densely populated areas than in rural areas. Almost one-half of the population in rural areas had no readily available chest clinics; 10 percent had no public health nursing services. In the areas where nursing services are available, three-fourths of the population had 1 nurse serving more than 10,000 population; 8 percent had 1 nurse to more than 25,000 people. To bring nursing services to recommended standards would require more than a doubling of staffs. With few exceptions, the nurses carried a generalized public health nursing service.

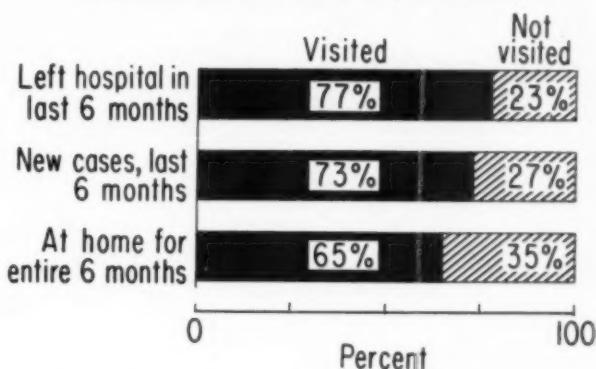
Therefore, it is somewhat surprising to find that public health nurses had made home visits to 69 percent of the nonhospitalized tuberculosis patients during the 6 months preceding the study.

However, it is significant that one-third of the patients seen at home were visited only once during the 6-month period. This was true for both the active and presumably active cases and for those with inactive disease on chemotherapy. Seventeen percent of the patients were visited more than 10 times in 6 months.

	Percent
1 visit only	34
2-9 visits	49
10-154 visits	17
Total	100

For many years it has been recommended that high priority for nursing service be given to patients newly reported or recently discharged from the hospital. We found that practice quite consistently follows this policy for public health nursing. Visits had been made to three-fourths of the patients discharged from hos-

Figure 9. Percentage of cases visited by a public health nurse within last 6 months.



pitals within 6 months and to three-fourths of the new cases reported to health departments (fig. 9).

Let us consider the one-third of all study patients who received no public health nursing service at home. The majority of these persons were not considered in need of service. One-fourth had never been referred for service, and physicians requested no nursing service for 8 percent.

	Percent
Service not indicated	33
Never referred	28
Physician requested no visits	8
No service available	7
All other reasons	24
Total	100

Some of these patients were under the care of the hospital or sanatorium outpatient department. The largest percentage were under the care of private physicians. Almost 200 of the patients who were not visited at home had unknown medical supervision or none at all.

One of the most serious deficiencies of programs in general is the lack of referral of patients and the transfer of information between physicians, hospitals, laboratories, social agencies, and health departments. Many health departments do not query private physicians periodically to ascertain current diagnoses or to establish whether the patient is still under care. Frequently, reports of laboratory examinations are not sent to the public health nurses giving care to the patient. Many hospitals do not include in their reports to the health department

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the diagnosis, sputum status, type of discharge, or recommendations for continued therapy. Many health departments do not know which patients are receiving help from social agencies, and frequently the social agencies do not know which patients in their caseloads have a tuberculosis problem. It is obvious that such practices as these result in disjointed and inadequate utilization of the community services available to patients and their families.

Social Aspects

Fairly widespread impressions have grown up that tuberculosis patients are predominantly social misfits, especially skidrow alcoholics. Because of the complexity of study of such matters, social data were collected only on certain basic factors such as marital status, family composition, major social problems.

Marital Status

More than half the patients in the study were married. This is approximately the same distribution as the United States census population of 1950. Thus, contrary to a common impression, tuberculosis is not just a problem of unattached men.

Composition of the Family

Of all active and presumably active cases at home, about 20 percent of the patients have children in the home under 5 years old. About half of the families with small children in the home have 2 or more children in this age group. Almost half of the patients at home did not have a room alone.

It is not necessary to elaborate on the obvious public health import of these findings. Because of the frequent report of problems in family relationships as well as financial and other social problems, we assume that some of these homes were not ideal settings for recovery. Criteria for homes suitable for treatment of patients with active tuberculosis have not been adequately developed. Furthermore, the very small proportion of patients receiving the broad services of organized home care programs indicates the need for a more extensive investiga-

tion and careful evaluation of the social situation of nonhospitalized tuberculosis patients.

Social Problems

About 46 percent of the patients on home care were reported as having major social problems.

	Percent
Practical needs	21
Emotional needs	25
Unreported	15
No major problems	39
Total	100

The types of problems fell into two broad categories: (a) such practical matters as insufficient income or inadequate housing, and (b) emotional areas relating to the patient's reactions to his illness and relationships between members of his family. The cases were almost equally divided according to these major types; however, there were a number of instances in which multiple problems existed.

Most of the patients who left against medical advice were included in the category of patients with social problems. We believe that for a large number of the patients who gave personal preference as the predominating reason for their rejection of hospitalization, social problems underlay their resistance.

The extent to which patients were receiving social service was analyzed. Of those patients reported as having a social problem, over 60 percent were not receiving social services of any type.

	Percent
No service	62
Public welfare	20
All other agencies	14
Unknown	4
Total	100

Approximately 20 percent had received service from a department of public welfare. The remaining 18 percent received service from other agencies and from medical social workers in health departments. Only 17 percent of the patients at home were receiving financial assistance from any agency. Generally, public assistance did not include grants for medical

costs since most social agencies consider the care of tuberculosis to be the responsibility of medical and public health agencies. Financial problems were often encountered in relation to the costs of medical care, especially the purchase of drugs when these are not provided free.

The majority of the patients and families who were being helped financially were receiving assistance from public welfare agencies. Some welfare departments consider the determination of eligibility and the provision of grants to be their full responsibility. Even when these agencies accept a broader responsibility, lack of trained staff and the usually large caseloads often limit the extent to which they provide casework services.

The greatest concentration of social agencies was found in metropolitan areas. However, it was of particular interest to discover that 80 percent of the study population in rural areas had no social services except for those provided by departments of public welfare.

Alcoholism

Special attention was paid to the extent of alcoholism among the nonhospitalized patients since this condition is generally considered an important factor in tuberculosis. The term "alcoholism" was listed by health department staff for patients whose drinking habits were considered a problem by the patient, the family, or the community. In only 6 percent of cases was alcoholism reported as a coexisting disease.

Approximately 11 percent of the men over 35 years were classified as alcoholic. Although the percentage of married persons classified as alcoholic is lower than that of either the single, separated, divorced, or widowed patients, the number of married alcoholic patients was largest since the majority of study cases were married. Nearly all of the patients designated as alcoholics had been hospitalized, but three-fourths left against medical advice. The public health implications are apparent.

We recognize the possibility that some of the hospitalized alcoholics may leave the sanatorium and disappear and thus not be available

for counting in our study. However, a similar low proportion has been found in other recent studies made by the Public Health Service Tuberculosis Program. Even so, we also recognize the importance of this problem in the individual patient.

Conclusions

Our study of unhospitalized tuberculosis patients shows that they are, in most respects, quite like other people. Probably the one most important result that the study points out is the serious limitations of tuberculosis programs for the care and supervision of known cases. Consequently, it gives us a guide for the improvement of these programs.

If we believe it is important to tuberculosis control to have precise, current information about tuberculosis patients who are in need of intensive care and supervision, and if we believe that adequate treatment of these patients determines, to a large extent, the effectiveness of disease prevention and control, the study findings disabuse us of complacency.

More specifically, the study delineates certain definite areas of action in which improvements must be made.

1. Precise information must be maintained about the current medical and social status of tuberculosis patients, their families, and their environment.

2. Health departments must summarize such current information to evaluate tuberculosis control problems and to plan programs on the basis of local needs.

3. Closely integrated service programs must be provided for diagnosis, treatment, social service, and public health supervision of patients.

4. To this end, efficient communication and exchange of information are required of health departments, private physicians, laboratories, hospitals, clinics, and other groups and agencies.

5. While private physicians need education and consultation on the techniques of diagnosis and treatment, there is an equal need for obtaining their understanding of the importance

of public health supervision for patients under their care.

6. Standards for selection of patients to be treated at home and in hospitals should be established, based on patients' needs and services available locally.

In closing, we feel that the study has succeeded in confirming, replacing, and reversing many generalizations concerning tuberculosis.

We have tried to point the way to future action in the community.

REFERENCES

- (1) Blomquist, E. T.: The nonhospitalized patient. *Am. J. Pub. Health* 56: 149-155, February 1956.
- (2) Anderson, R. J., Sauer, H. I., and Robertson, R. L.: Tuberculosis cases known to health departments. *Pub. Health Rep.* 68: 641-646, July 1943, (a) p. 643; (b) p. 644.

The Social Significance of Chronic Illness

By LUCILLE M. SMITH

EVERY PATIENT with tuberculosis, like every patient with a long-term illness, has one need which overrides all others: to be looked upon as an individual, a whole person—not a disease or a stage of a disease or the focus of a program. And his identification as a person must, of course, be specifically related to his family and to the community of which he has been and is a part.

Other needs of care arise from the nature of the illness as distinguished from the characteristics of the individual. Tuberculosis, although still essentially a chronic disease, combines some of the patterns of both acute and chronic illness. The new therapies have introduced some possibilities for fairly rapid changes in the

patient's physical status; he now may experience marked improvement in weeks instead of years. Yet, exacerbations and remissions may occur, and treatment must be modified accordingly. Thus, the patient's reactions and responses to his condition are likely to be in a state of flux, and the care he receives must accommodate to this flux.

How extensive is the variety of services that long-term patients require? A committee at the 1954 National Conference on Care of the Long-Term Patient listed 30 needs, several, or even all, of which a long-term patient will require while at home, or while in a hospital or some other type of institution. This list shows not only the complexity of the patient's needs but the formidable problem of community organization required to assure ready availability of the service indicated (see inset).

We need to appreciate fully that the entire problem of long-term care is not a collection of separate problems to be solved one by one in simple progression. For the community, as for the individual, long-term illness presents a complex of needs so interrelated that many require simultaneous attention. And simultaneous attention is possible only if the

Mrs. Smith, chief, Health Services Organization Branch, Division of Public Health Methods, Public Health Service, presented this paper at the annual meeting of the National Tuberculosis Association in New York City, May 23, 1956. Extensive use has been made of an analysis of the major elements in long-term care from chapter 1 of "Care of the Long-Term Patient," a report of the Commission on Chronic Illness to be published shortly.

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30 Needs of Long-Term Patients

Medical supervision	Sheltered work, at home or elsewhere
Drug and diet therapy	Personal adjustment training
X-ray therapy	Homemaker service
Surgery	Transportation
Psychiatric treatment	Financial aid
Rehabilitation	Assistance in obtaining adequate housing
Dental treatment	Foster home care
Social service	Legal aid
Bedside nursing	Convalescent care under medical supervision
Physical therapy	Custodial care
Appliances	Counseling to modify the family's and the patient's attitude toward chronic illness
Training in the use of appliances	Friendly visitors or volunteer corps
Occupational therapy	
Training in self-care	
Vocational counseling	
Education	
Religious opportunities	
Vocational training	

major elements of the problem are widely recognized and their relationship understood.

Elements of Long-Term Care

First of all, there is the relationship of tuberculosis and general medical care: Each requires integration with the other. Second, rehabilitation must be incorporated within all phases of care. Third, we must genuinely ask ourselves: Is institutionalization the primary solution to the problem? The fourth major element concerns mental health: How can we refocus the objectives of both tuberculosis and mental institutions so that adequate mental health services are available in tuberculosis hospitals and adequate care for tuberculosis in mental hospitals? Fifth, how can we improve and extend present, and develop new, means of financing long-term care? The sixth element is that of increasing the numbers of trained personnel and improving the quality of their training. Seventh, every community, and local, State, and national health and welfare organization needs to improve ways to coordinate facilities and services for tuberculosis patients. Eighth, there is need of accelerating improve-

ments in attitudes toward tuberculosis, and, indeed, toward all long-term illness. Finally, broad measures are needed to produce additional facts on the extent of the problem and the utilization of medical care resources for long-term care.

Integration With General Medical Care

Medical care has been geared to short-term illness except in special facilities devoted to particular categories of long-term illness, such as tuberculosis.

A general hospital, for example, is likely to operate at a tempo primarily designed for emergencies, a tempo quite unsuited to the chronically ill. Further, professional interest tends to gravitate to the acutely ill except in hospitals with a well-rounded and active teaching program. Attention to the nonacute phases of chronic illness is inclined to be transient and minimal, and professional services to the long-term patient are often meager. In the past, this has resulted in the all too familiar practice of excluding tuberculosis patients from general hospitals. Sometimes, unhappily, it has resulted in substandard tuberculosis care in those few general hospitals which do accept such patients.

But one should not assume that neglect of long-term illness will be corrected by further separation of the long-term patient from general medical care. On the contrary, prevention and care of chronic ills should be an integral part of general medical care.

An encouraging move in this direction is the slowly developing program for routine chest X-rays of all persons admitted to general hospitals. About 24 percent of all general hospitals have such programs, according to reports to the American Hospital Association for 1954 (1). If this program is used to detect early tuberculosis among persons not yet aware of symptoms, it will be a valuable means of integrating general and long-term care. If, however, the program is used to expedite the transfer from the general hospital of all patients

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newly discovered to have tuberculosis, it will serve further to separate the two.

Rehabilitation

Failures with regard to rehabilitation are of two kinds.

Few think of rehabilitation as an integral part of care. Few discern its important implications for prevention. Rather, it is conceived of as a definitive action to be tacked on at the end of definitive medical care.

Moreover, many people think that rehabilitation is necessarily expensive, that it calls for the elaborate equipment and specially trained personnel of the rehabilitation center. For some patients, to be sure, it is. But such outstanding authorities as Rusk and Kessler repeatedly assert that much rehabilitation is accomplished by simple methods—methods based on an understanding of man's emotional make-up. Nevertheless, it is still commonplace for a patient with tuberculosis to be hurried into a sanatorium before satisfactory plans are made for the support of his wife and children, before he has been assured that his family has not contracted the disease, before he has had fully explained to him what his regimen is to be.

Suppose his disease is discovered in an occupational health survey in a factory where he has just got a job after a long period of unemployment. Probably he will resist violently an abrupt recommendation that he be hospitalized. If he has recently been promoted, or had some other long overdue good fortune, he will need time to become accustomed to the idea that he is in trouble.

If he enters the institution and finds that it has rigid and arbitrary visiting hours and that he has arrived just after one of them, he may suffer unnecessary anguish before he can see his wife again. Such incidents typify unnecessary hazards to restoration of his health.

These incidents represent not so much failure on the part of individual providers of health services, but faulty policy—in the welfare or health department, the factory, the hospital. They point up neglect of rehabilitation possibilities per se. They demonstrate failure to

recognize that rehabilitation can prevent further deterioration; that proper preventive measures often obviate the need for rehabilitation and reduce the need for treatment; that prevention, care, and rehabilitation are inseparably intertwined.

Home Care Services

Institutional care as the solution to long-term care problems has long been overemphasized. Even though less than one-fourth of our long-term patients are in hospitals and other medical institutions, many who are in such places could be cared for as well or better at home. Construction of some additional medical treatment facilities is still needed, particularly for patients needing rehabilitative services and those whose need is primarily for skilled nursing care. But more and more beds for long-term care will not provide the care needed.

Private practitioners and administrators of general, tuberculosis, chronic, and mental hospitals verify this fact: There are in institutions large numbers of patients whose requirements for care could be better met in the home, if nursing and other services could be made easily available to them—a Gatch bed for the tuberculosis patient; someone to give him an intramuscular drug; someone to help him in and out of bed occasionally; someone to shop for the housewife with tuberculosis.

The story is repeated over and over. As soon as one important need of the patient develops that the family cannot meet, he is placed in a hospital or in some other institution, and then what happens? Once the admission occurs, his place in the home may be lost forever. The doctor and social worker who later try to help the patient and his family plan for his return find that the readjustments he must make are insuperable.

Home care is one antidote to overinstitutionalization. One of the most constructive steps a community can take is providing a generous measure of the services which will enable families to care for their own at home. Each community will need to determine for itself what services should be offered and by whom. The

most frequent and perhaps the most important service is that of the visiting nurse, providing bedside care. Other important home services would include social casework, physical and occupational therapy, homemaker service, friendly visitors, and the loan of wheelchairs, hospital beds, and bedside equipment. These services may or may not be integrated into a fully organized home care program; but if the services are easily available, if administrative obstacles to their use can be removed through skillful community organization and, if practitioners of medicine are fully informed about these services and will in fact make full use of them, then the community can make substantial progress in preventing unnecessary and unwise institutionalization.

A word of caution is indicated concerning the concept of home care. This phrase to some means simply care at home for the nonhospitalized tuberculosis patient. To others it means something more comprehensive, such as "organized programs having centralized responsibility for the administration and coordination of services to patients and for providing the minimum of medical, nursing, and social services, and essential drugs and supplies" (2a). Both kinds of home care have their place in a community. Of 11 organized home care programs in the study made by the Public Health Service and the Commission on Chronic Illness (2b), patients with tuberculosis were under care in 5.

Example of Good Home Care

The following case shows how a good home care program, administered by a general hospital under Jewish auspices in a large midwestern city, has served a patient with tuberculosis.

Following X-ray examination in a mobile unit, Mrs. A., age 33, was told she had active pulmonary tuberculosis. The public health nurse in her followup visits was met with denial of the diagnosis. Mrs. A. adamantly refused to consider the necessity for care in a State sanatorium 240 miles away from home. Finally, she consented to discuss the possibilities

for care in the home care program of a private general hospital.

In discussion with the home care social worker, Mrs. A. continued to deny the diagnosis of tuberculosis. At the same time, however, she expressed her dual fears of infecting her young adopted sons, ages 5 and 7, if she remained near them, or of crippling them psychologically if she left them for an extended period for medical care.

Mrs. A. is an intelligent person of broad interests, a highly skilled commercial artist, whose primary interest is her family. She had experienced many complications in achieving the adoption of her two sons, brothers who had previously been in several homes. These youngsters had barely acquired a degree of security with their adopted parents. Mrs. A.'s husband, an auditor, had a position which often kept him away from home except for weekends. Their income was about \$5,000 a year. They were buying a 4-bedroom home in a suburb.

With trepidation, Mrs. A. decided to risk intensive study in the general hospital to see if she could be attended properly in the home care program. A 10-day study in the hospital revealed far advanced tuberculosis with cavitation in the left upper lobe. Sputum was positive. Treatment requirements included: regular medical supervision; complete bed rest in a room to herself with bathroom privileges; isolation, for example, no visitors in her bedroom; relief from all household responsibilities; and most important, full cooperation of the patient in following these requirements.

In this home care program, the medical chief, after staff conference, makes final judgment on the willingness and ability of his patient to give full cooperation. After much discussion with Mrs. A., he decided that she wanted to and would follow his recommendations at home.

The social worker with the family had found that Mr. A. and the children believed that they could live with Mrs. A. and help her follow medical recommendations. Physical arrangements in the home were excellent. A full-time homemaker—capable of managing both the household and the two children—was found to live in. The visiting nurse could reinforce

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with home teaching the doctor's instructions. The social worker would visit regularly and be on call. The home care doctor would pay periodic visits to the home.

This patient went home from the hospital on October 1, 1954. The children had a small dining table in the hall outside her room. They had their meals at the same time she did. Their chairs were always in the same place for short periods of conversation. Her quiet periods coincided with their school hours and bedtime.

This was a limited type of life for a vital woman such as Mrs. A. By spring, she longed for her usual garden activities and friends. Her doctor began to authorize graduated activities. For example, she was permitted to have tea with some of her neighbors, who sat in the yard outside her window while she remained in her bed.

By August 1955, Mrs. A.'s sputum was negative. By November 1955, she was readmitted to the general hospital for chest surgery. A left upper lobectomy was performed. She continued to make excellent progress and in May 1956 was discharged from the home care program.

The strength and unity of this family have been greatly protected and preserved in this period of grave illness. Even so, the two children, as well as Mrs. A., are now overconscious of health. The children show some fear for their mother's health. She in turn does more for them at this time than most 8- and 10-year-olds need. The social worker in the home care program will continue to work with Mrs. A. to aid in her efforts to reach a better balance in helping her children achieve normal growth to independence.

For those who may be moved to explore the possibility of a home care program in their own communities, guidelines for establishing such programs are published by the Public Health Service and the Commission on Chronic Illness (2b).

Mental Health

While prodigious sums are spent for maintenance of mental patients, comparatively little is spent on treatment and study of mental ills.

Many patients with a primary diagnosis, such as tuberculosis, also suffer mental illness. In fact, sooner or later most long-term patients develop emotional afflictions. In short, mental illness permeates the entire field of chronic illness. In mental hospitals there is too little treatment of tuberculosis; in tuberculosis hospitals, too little emphasis on psychiatric care. The major need for improving this situation is a vast increase in community mental health services and an overhaul of mental institutional services with an active program of therapy as the core of the program. Improvements in comprehensive care for tuberculosis patients also will moderate many of their mental stresses.

Money

The financing of care for tuberculosis presents a paradox. Not enough money is being devoted to such care; yet a considerable portion of that which is spent is not used effectively. As the Commission on Chronic Illness says in its report, *Care of the Long-Term Patient* (3a): "Because of inertia, outmoded practices persist; because of timidity, measures demonstrated to be practical in some communities are slow to spread to others; because of frugality, approaches are adopted that prove to be 'penny-wise and pound-foolish'; because of vested interests, the status quo is maintained when a fairly thoroughgoing realignment of methods of providing and financing services would be more economical. . . .

"As voluntary health insurance continues to grow, more money will be available for the care of those who can afford to pay the basic premiums. Trends are in the direction of extending coverage and modifying policies in ways that will benefit the long-term patient; but large groups of these patients are still excluded from the bulk of private insurance and from nonprofit voluntary prepayment plans."

The limitation of insurance on preexisting conditions is one example of an exclusion that adversely affects the patient with tuberculosis; another is the common 120-day limitation on hospital care.

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"Government funds are frequently held to a parsimonious level, reflecting the traditional philosophy of providing minimum subsistence and care rather than reconstruction of the health of the person. All too often public monies are made available in ways that practically preclude their more effective use. The manner in which they can be spent may be so restricted by law that they can pay for some services but not necessarily the kind of service the patient needs. Government often waits until the patient is reduced to the level of public assistance, missing earlier opportunities to halt the deterioration of his health. This in spite of the fact that many programs which are adequately supported are demonstrating good results" (*3b*).

Although private charities cannot carry a major share of the operating costs of care of the long-term patient, their use of "venture" capital has been a unique contribution in developing counseling services, homemaker services, and home care programs. Such pilot demonstrations may be used to muster a greater degree of public support.

Personnel

For long-term care, probably the most serious personnel needs are: general practitioners; psychiatrists; specialists in pulmonary medicine and in physical medicine and rehabilitation; public health physicians; nurses, particularly the public health nurse giving bedside care and the practical nurse; trained attendants; medical and psychiatric social workers; occupational, physical, and speech therapists; and vocational counselors. Most of these shortages are not due primarily to insufficient capacity of professional schools. The schools which offer training for most types of the needed personnel report a lack of students.

A few facts on the availability of one class of needed personnel—the medical social worker—will suffice to illustrate the seriousness of these shortages. These facts are available from a joint study by three organizations: the American Hospital Association; the medical social work section of the National Association

of Social Workers; and the Public Health Service. It is to be published this fall.

One in every three hospitals for tuberculosis and other long-term patients has a social service department, but only 1 in 8 hospitals for short-term patients. Perhaps, for long-term patients this sounds reassuring. Nevertheless, the sober fact remains that 65 percent of the 410 tuberculosis hospitals have no social worker; 24 percent have only 1 worker; and only 7 percent have more than 3 social workers.

Considerably more patients receive social services in tuberculosis hospitals than in general hospitals. But even in the tuberculosis hospitals, only 35 percent of those in hospitals with social service departments receive this type of service; these amount to 20 percent of patients in all tuberculosis hospitals.

The proportion of graduate social service personnel is somewhat less in tuberculosis hospitals, 60 percent, as compared with 62 percent in general hospitals for short-term patients, and 73 percent in general hospitals for long-term patients.

Other findings suggest that social service departments in tuberculosis hospitals may not be as well integrated with other departments as are departments in general short-term and long-term hospitals. Conspicuous contrasts are shown by the participation of social work departments in such activities as meeting with hospital administrators and ward rounds. Seventy-one percent of the departments in tuberculosis hospitals had met with the hospital administrator, as contrasted with 90 percent in general long-term hospitals. On ward rounds: 27 percent of the departments in tuberculosis hospitals had participated in ward rounds, as contrasted with 62 percent in general long-term hospitals. Twenty-eight percent of the departments in tuberculosis hospitals make no reports to the hospital administrator as compared with 7 percent of each of the other types of hospitals.

With respect to specialty consultations, the proportion of departments having psychiatric and other medical specialty consultations is substantially smaller in tuberculosis hospitals than in the other types of hospitals.

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These findings suggest the desirability of special efforts by voluntary and official agencies to strengthen existing administrative relationships through such measures as special studies, consultation, and institutes. The need for additional scholarship aid for both the first and second year of graduate training is equally obvious if the tuberculosis hospitals are to be adequately supplied with graduate social work staff.

Not only must the numbers of most health personnel be increased, but educational programs must be refocused to produce personnel who will be interested in and equipped to care for long-term illness. Education for most of these professions traditionally has been directed to acute illness and has been provided principally in a hospital setting. Interest and skill in serving patients at home need primary emphasis.

Coordination of Services

Lack of coordination of services in some communities is greater than the lack of money. One cannot overemphasize the importance of good working relationships among diverse community agencies, facilities, and interests.

In recent years a promising start in coordination and integration has been made in many localities.

In a few scattered communities—Essex County, New Jersey; Chicago; Milwaukee; and San Francisco, for example—central services for the chronically ill have been established under voluntary auspices to advise patients, their families, and physicians on where various types of counseling and referral service can be obtained. People can be helped to examine various solutions for their problem, learn what and where various services are available, what they are likely to cost, and which services are available without charge or on a part-pay basis.

A single source of these counseling and referral services, however, is most unusual. Most victims of long-term illness must attempt to make contacts with a vast number of programs, agencies, and institutions before they can locate the specific service needed at a given time

and, if the cost is beyond their means, find a source of funds with which to pay.

Local tuberculosis associations can do much to help establish similar services in other communities. We have only begun to tap the possibility of joint financing by the voluntary health agencies of much needed community services, of which counseling and referral are but one example.

Another type of coordination is that which is possible nationally. The experience of the Commission on Chronic Illness is a notable example. Born of the wish of four national professional associations and the Public Health Service to make order out of various unrelated efforts to improve long-term care, the commission has concluded its brief but highly successful career. It is gratifying to see some of the forecasts of things to come. The American Medical Association, for instance, is now publishing the *Chronic Illness News Letter*, in connection with which it will also serve as an information center for the many inquiries which the *News Letter* stimulates.

A committee has been appointed to develop a program of research and education relating to the aging processes. This committee has already begun plans with the Public Health Service for ways to bring together State medical societies and State health departments on projects to improve the health of older people. Still another committee is reviewing the progress being made by the voluntary prepayment plans in extending coverage to the long-term patient.

In the field of rehabilitation, the American Medical Association has recently created an intra-association group, consisting of representatives of several of its councils, to look into the present status of rehabilitation, review existing programs and procedures, and suggest methods for improvement and coordination. Field work by the Council on Medical Service is already underway.

The American Hospital Association meanwhile has appointed a Committee on Chronic Illness in its Council on Professional Practice. The committee plans to publish new materials to (a) further accentuate the vital role of rehabilitation, (b) answer how-to-do-it questions

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including those of financing the hospital care of the chronically ill, and (c) show examples of good programs in action.

The American Public Health Association and the American Public Welfare Association likewise are projecting programs in which the major objective is to achieve coordination of services and facilities—in itself an example of coordination.

Attitudes

Attitudes toward long-term illness, warped for generations, are changing as its nature and the needs of its victims become understood and as methods of treatment are learned. Neglect and pessimism are being replaced by an aroused social conscience and by confidence in the value of treatment and rehabilitation. The change is not sufficiently rapid or extensive, of course, and it needs to be accelerated among persons in the health professions even more than among those in the general population.

In the past, misconceptions constituted the single most important block to changing attitudes. Because much long-term illness is painful, ugly, depressing, and costly, it is still a major feat to gain attention and a constructive attitude for its victims.

Nevertheless, negative ideas have yielded. Long-term illness is no longer commonly regarded as hopeless and the care of the long-term patient is becoming a successful undertaking.

Need for Additional Facts

The final major element in the community's chronic illness program, the need for additional facts, should be first. Although most families are affected by it, we have no accurate up-to-date measure of the dimensions and various characteristics of long-term illness. Considerable research is being conducted on causes of the various chronic diseases and better measures for treatment, but little attention is given to studies of how best to apply what knowledge we already have.

Since 1949, the United States National Committee on Vital and Health Statistics has emphasized the need for more adequate informa-

tion on illness. In 1953 that group published a blueprint of the needs for statistics on illness in the general population (4). In addition to a few community studies, the Federal Government is now about to undertake a continuing health survey. Data collected on a sampling method will provide periodic estimates for the country as a whole and by regions on the prevalence and incidence of the major categories of sickness and disability.

The information obtained will include for each major disease and type of impairment "such things as number, age, sex, occupation of persons afflicted, the duration of disability, the amounts and types of medical or other services received for, or because of, the illness or disability, and ability to work or engage in other activities, for example, the ability to attend school in the case of a child, or, in the case of a housewife, ability to perform usual household duties" (5).

These surveys will provide facts much needed to comprehend the problem of chronic illness and to give direction to community plans for its solution.

REFERENCES

- (1) Hospital statistics. Hospitals. Administrative Guide Issue 29: 7, 54, August 1955, pt. II.
- (2) U. S. Public Health Service; Study of selected home care programs. A joint project of the Public Health Service and the Commission on Chronic Illness. Public Health Service Pub. No. 447, Public Health Monogr. No. 35. Washington, D. C., U. S. Government Printing Office, 1955, (a), p. 3; (b), 127 pp.
- (3) Commission on Chronic Illness: Care of the long-term patient. Cambridge, Mass., Harvard University Press, 1956, (a), pp. 17, 18; (b), p. 18.
- (4) U. S. National Committee on Vital Statistics: Proposal for the collection of data on illness and impairment. A report of the Subcommittee on National Morbidity Survey. Public Health Service Pub. No. 333. Washington, D. C., U. S. Government Printing Office, 1953.
- (5) Coggesshall, L. T.: Statement before the Subcommittee on Health and Science, U. S. Congress House Committee on Interstate and Foreign Commerce. *In Hearings . . . H. R. 4089, H. R. 8913, H. R. 9016, and S. 3076. 2. National health survey. Eighty-fourth Congress, second session.* Washington, D. C., U. S. Government Printing Office, 1956, pp. 26-27.

Patients Who Disregard Medical Recommendations



The tuberculosis patient who refuses to follow medical advice is a subject of major concern. It is frequently assumed that "uncooperative" patients are of certain prototypes and that the unattached, transient, male alcoholic is the most numerous. Another widespread assumption is that most nonconforming patients are inadequate personalities who react as they do because of economic and social pressures. Compulsory isolation is often considered to be the only effective method of management.

Though some aspects of this problem—primarily, why patients leave hospitals against medical advice—have received intensive study, relatively little research has been directed to learning why other patients with similar circumstances are willing to accept hospitalization; to determining whether patients at home follow medical instructions; or to developing means of helping patients who refuse to stay in the hospital. The various research projects completed in recent years have at least provided some knowledge which bears upon current assumptions and which suggests ways of helping the problem patient.

One major finding is that there is no predominating type of recalcitrant any more than there is a predominating cause for his behavior. Resistance to restricted activity, to medical authority, to isolation from family and social contacts, as well as fear of boredom, are normal responses in an individual accustomed to controlling his own destiny.

Some patients may acquiesce for a long time only to rebel in a crisis. Others may deliberately break discipline because they project their

By Ruth B. Taylor, M.A., chief medical social consultant, Tuberculosis Program, Division of Special Health Services, Public Health Service.

hostility toward tuberculosis onto the hospital or society. Most have plenty of time to brood over their worries. The patient who has two diseases, alcoholism and tuberculosis, and the really mentally or emotionally disturbed patient who requires psychiatric as well as medical treatment, add to the complexity of the pattern.

The first step for devising ways of helping patients who do not follow medical recommendations is to identify the contributing factors. A further implication is that the method of helping must be adapted to the special needs of each individual.

My comments will be directed to a discussion of patients who leave the hospital against advice and patients who resist entering. Other forms of resistance, both in and out of the hospital, include refusal to permit surgery, failure to follow orders for restricted activity, evasion of medical supervision, working without medical approval, and refusal to take drugs. The same principles apply in all of these problems.

The Patient in the Hospital

Some research projects describe a method of predicting potential discharges against medical advice, and psychologists have concluded that these patients can be helped if kept under close surveillance. My own feeling is that any patient is a potential recalcitrant under circumstances of stress. Hospital patients react to stress situations more vigorously than they would to similar stimuli outside the institution. Society must help the tuberculosis patient withstand the pressures to which he is subjected, for the sake of his own recovery as well as for the protection of those he might infect. Its responsibility for protecting him against needless irritations is even greater. On occasion, hospital and health personnel unwittingly contribute to the many pressures which may push the individual beyond his powers of endurance.

Higgins and Kaplan in the *Journal of the American Medical Association* (May 1953) shattered some of the illusions about the hospital as a place of refuge and security. Their study showed that relationships among patients,

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relationships between a patient and a member of the ward staff, conflicts between one member of the staff and one or more of the ward personnel can influence, adversely or positively, the individual's course of treatment in the hospital. The death of another patient, a fluctuation in the physician's level of interest, the waxing and waning in the intensity of nursing care are described as significant contributors to stress.

Other studies support the premise that factors within the hospital setting contribute significantly to unauthorized discharges. One analysis indicated that two-fifths of the patients who left did so mainly because of such factors. Predominating among reasons given for leaving were dissatisfaction with medical treatment, hospital rules and procedures, and with the attitude and amount of interest shown by hospital personnel. Next in order were lack of facilities or concern for treatment of other ailments, conflicting medical opinions, and the physician's refusal to discuss the patient's condition with him.

Coleman, writing in the *Journal of the American Public Health Association* (July 1955), observed that though some few tuberculous patients can only be helped by psychotherapy, the majority can be helped by psychiatrically oriented physicians, nurses, and social workers. To these statements I would add my own conviction, notwithstanding the importance of specialized training, that the personal qualities of sympathy, objectivity, courtesy, and warmth are primary requisites for a professional worker.

The foregoing comments may be summarized as follows:

1. Granted that personality or social problems may lead to a patient's refusal to follow medical advice, we must not overlook the possibility of other contributing factors. These are primarily attitudes of hospital personnel toward patients and the willingness of such personnel to adapt administrative procedures to the needs of the patients. Flexibility or change is not always possible immediately, but professional personnel sometimes forget that institutions are for the patients, not structures in which the patient is only an incidental entity.

2. Responsibility for the welfare of the patient is shared by all persons in the hospital and by others on the outside. Some emotional outbursts may be expected to occur at any stage in any long-term illness. We cannot always avoid such outbursts. We should, however, in addition to providing the best of medical care, direct our efforts toward understanding the patient, being alert to possible pressures, trying to relieve the pressures before they become critical, providing an outlet for the expression of feelings without fear of recrimination, helping him directly or indirectly in resolving difficulties which create concern, and providing in general a comfortable atmosphere in which he can recuperate.

The Patient at Home

Before discussing ways of helping the patient who refuses hospitalization, let us face the fact that the controversy among medical authorities over whether a patient with active tuberculosis belongs at home or in a hospital has undoubtedly reached the patients. It is not surprising that they are confused about the importance of institutional care. The impressions of professional people working with the tuberculous patient are that he may resist hospitalization because he believes it no longer necessary.

Not to pursue this subject further, I shall cite two experiences which independently led to the same conclusion although they occurred several thousand miles apart and involved workers who were never in communication with each other.

Fifty recalcitrant patients were referred to a medical social worker in one health department and 50 to a sanitarian in another, to determine how these departments could persuade patients to accept the hospitalization they had refused. Both workers concluded that only 2 or 3 of the patients were genuinely recalcitrant. The remainder responded to the genuine interest displayed and help received. The 47 or 48 patients who subsequently accepted hospitalization voluntarily represented as many different situations and were alike only in that they were not actually recalcitrant. It follows then that we often label patients resistant when they

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simply need more, or better, or different types of help in understanding and accepting medical recommendations.

Many dedicated health personnel have expressed feelings of frustration about the problems presented by patients who will not follow medical recommendations. They may pass more stringent laws. They may work with the courts to insure that forcible hospitalization will be approved when cases come up for consideration. They may withhold drugs or clinic services. They may develop locked wards or jail facilities. And they may use, sometimes reluctantly, all of the authority vested in their positions to protect the public health. Because the majority of patients in direct contact with health departments are in the lowest economic stratum, the impression has grown that the tuberculous belong to the socially inadequate segment of society. A corollary appears to be that they must therefore be handled by authoritative means. There are certain dangers inherent in this philosophy. To the extent that we stigmatize and use coercion on patients, the more likely they are to "go underground."

Actually, our studies have revealed an insignificant proportion of any predominating type of tuberculous patients, recalcitrants or otherwise. There are, of course, cases in which force alone seems indicated. Some psychiatrists believe that patients who are at odds with society can best be helped by authoritative, nonpunitive handling and that such patients receive real benefit from isolation in a facility especially adapted to their particular needs. Many an intractable alcoholic who has walked out of numerous hospitals responds to enforced treatment when it is tempered with sympathetic attention and the full gamut of psychiatric, social, and rehabilitation services.

Undoubtedly, we already have most of the answers to this problem of interpersonal relationships between patients and staff. The hiatus is between knowledge and its application. Since no two patients and no two situations are really alike, generalizations are often dangerous. Even so, I shall make a few generalizations in conclusion.

1. One might well expand Tollen's remark that "the prevention of irregular discharge begins at the start of treatment," and say that the prevention of resistance to medical recommendations begins early in the patient's life. However, because human nature has the capacity to change, each new experience can be positive or negative in its impact, and even well-adjusted people are not immune to overwhelming pressures. Those who have certain emotional inadequacies can also be helped through a crisis situation. When tuberculosis is suspected, an opportunity is present for influencing the patient's attitudes by the way in which his condition is interpreted to him. As he progresses through medical treatment, each new situation either facilitates or hinders the adjustment according to the way in which this crisis is met.

2. Compliance with medical recommendations is not always synonymous with satisfactory adjustment. The impact of the emotions on the progress of tuberculosis is well established. The acting out of resistance may upset the staff but benefit the patient. Attempts to impose certain standards of behavior on patients increase resentment. Acceptance, on the other hand, of these reactions as normal, and of patients as people with a right to express their opinions lessens their need to fight persons who are helping them fight their disease.

3. Skilled professional staff of the several disciplines should be available to provide their interrelated services throughout the course of diagnosis, treatment, and rehabilitation. The assistance of family members and friends must be mobilized to lend support to the patient and facilitate his acceptance of needed care. Community resources should be accessible, and their staffs should have an adequate understanding of the medical and social implications of the disease and of its significance to the individual patient.

4. Special problems often require the development of new skills. Cultural patterns must be understood. When an Indian is hospitalized hundreds of miles from his hogan, his photograph is sent periodically to relatives to show

health gains. There must be a willingness to find ways of adapting such practices imaginatively. Insistence upon conformity to a pre-conceived set of standards may only thwart all other efforts. Respect for the individual and his right to be different is fundamental in all social relationships, and especially when the individual is a tuberculosis patient.

Pulmonary Nodules Found In Cleveland Survey



To provide accurate rates on the frequency with which malignancy is found among solitary nodules in the lung parenchyma, a study was made of 666 persons in the Cleveland 1949 chest survey whose X-ray film revealed a nodule that was roughly spherical or lobulated in shape, fairly well circumscribed, at least 1 cm. in one diameter, and not obviously calcified. In the mass survey 673,218 chest X-rays were taken.

Followup, which included pertinent interval history and further X-rays, began 5 years after the survey, in March 1954, and continued through June 1955. Only 3.3 percent were of completely unknown status at the end of the observation period. The average followup time for those with complete followup was 5 years and 3 months.

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Nodules occurred 5½ times more frequently among older persons aged 55–64 (about age 60) than in persons aged 25–34 (about age 30) and more often in white than in nonwhite persons. Among women the frequency rate was 0.87 per 1,000. The male rate of 1.12 was 30 percent higher. Neither the race or sex differences are due to age distribution of the population. Response to the X-ray survey was poorer among the older age groups in 1949 than among the younger age groups, but even if the response had been better and the study had included more persons, there is no reason to believe that the age-specific nodule frequency rate would have been different.

In 85.4 percent of the study population, no definite diagnosis had been established at the end of 5 years. Only 3.0 percent of the nodules were proved malignant, and 9.0 percent were proved to be or very probably were of tuberculous etiology; 2.6 percent of the patients had lesions of other etiology. No diagnosis, not even a suspected diagnosis, was made in 74.7 percent of the patients with nodules. However, in 10.7 percent, tuberculosis and cancer were presumed, and it seemed quite likely that malignancy may develop in a certain number of nodules of unproved etiology. Most of the nodules were diagnosed early.

No malignancies occurred in patients under 45 years of age. In all, there were 19 cases of cancer and 1 of Hodgkin's disease. Sixteen patients were male and 4 were female. Pulmonary resection was performed in 7 patients with cancer. Three of the seven were alive at the end of the study. Definite or probable calcification was found in 181 nodules, but none of these proved to be malignant. None of these nodules had appeared on the original film. Even if the persons least likely to have malignant nodules are excluded from consideration, the cancer rate is only 9.9 percent (see table).

The shape of the nodule appeared to have no prognostic significance, but the size appeared to be of considerable importance. In 43 persons the nodules were 4 cm. in size or larger; 10 of the 43 were subsequently shown to have malignancy. Roughly half of the malignancies were in persons with the larger nodule, and in

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Cancer etiology rates in Cleveland study

Population	Num- ber of persons	Cancer	
		Num- ber	Per- cent
Study group	666	20	3.0
Number with followup information ¹	593	20	3.4
Excluding definite and probable calcification	412	20	4.8
Excluding men under 45 and all women	225	16	7.1
Excluding definite and probable calcification, men under 45, and all women	161	16	9.9

¹ Does not include 51 persons known to be alive but for whom there is no other information, and 22 not known to be dead or alive.

no case of malignancy was the nodule smaller than 2.0 cm. The nodule was on the right side of the lung in 68 percent of the cancer cases and 61 percent of all study cases. A larger proportion of the medially located nodules were malignant than those in the lateral portion of the parenchyma.

Five hundred thirty-five of the patients (80.3 percent) never had any illness attributable to the nodule. After 5 years only 18 (2.7 percent) had died of the nodule, and only 23 (3.5 percent) of the living had any symptoms attributable to the nodule—17 had tuberculosis, 2 had cancer, and 4 had diagnoses of possible cyst, pneumonia, benign tumor, and suspected tuberculosis. In 90 (13.5 percent) the health status was not determined. Forty-four whose health status with respect to the nodule was not known died of unrelated causes. Twenty-four were known to be alive, but for 22 there is no information at all.

Age-specific mortality rates for the study population and for Cleveland are substantially the same. Although the total mortality among the study group was substantially higher than for Cleveland, the difference is attributed to the higher average age of the study group.

From these findings, it appears that a high index of suspicion of malignancy is warranted in white men over 45 years of age with nodules

of 2.0 cm. or larger. Individualized determination and utilization of every diagnostic tool are essential with the realization, however, that solitary pulmonary nodules are not as hazardous as previously thought. Unfortunately, it is not possible to prove preoperatively in the vast majority of cases which nodules are malignant and which are not.

Recent Tuberculin Testing Experiences in Iowa

Our purpose is to find tuberculosis, and it stands to reason that we should search for it where it is most likely to be found.

With our long years of experience, it would seem that our approach in the future must give greater attention to those persons who are harboring tubercle bacilli in their bodies by evidence of their reaction to the tuberculin test.

Since 1952, an epidemiological study committee of the Iowa Trudeau Society has been investigating the extent of tuberculosis in Iowa. Among other things, the committee was curious to know the infection rate among the general population.

Investigation revealed that some tuberculin testing has been done in various locations in the State, but the programs varied widely from the standpoint of selectivity and techniques, and little emphasis was placed upon the accumulation of data. Thus, attempts to gather information on tuberculin testing were soon abandoned.

The committee felt that uniformity of procedures in tuberculin testing would have to be established in order to evaluate the amount of tuberculosis infection and agreed upon two approaches: school certification and mass tuberculin testing on a countywide basis.

The Iowa Subcommittee on Tuberculosis of the American School Health Association was appointed in December 1954. The subcommittee established standards to be observed in tuberculin testing of school students and school personnel in Iowa. Schools which meet the established qualifications receive the association's tuberculosis control award.

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Choice of administering either the Mantoux test or the Vollmer patch test is made by the county medical society.

To assure statistical information from each testing program, a key punchcard has been devised for machine tabulation. Use of the punchcard is a prerequisite of certification. The program cost includes punching and tabulating costs. The cards give data on age, race, sex, occupation; whether the Mantoux or patch test was used; and whether the reactions were negative, positive, or converter.

A statistical summary of more than 200 schools which have already been certified, including the number of new cases discovered, is included in the full paper.

Once the number of tuberculin reactors in a community is determined, this comparatively small group lends itself to practical reexamination at frequent intervals. It has been proposed that a registry of tuberculin reactors be established in Jones County. As time goes on, other reactors can be added to the list. Plans can be made to X-ray periodically everyone on the registry. The frequency of reexamination will need to be determined from experience. Such a plan is economically and physically possible.

It is reasonable to assume that in Iowa, where in 1954 the rate for new active cases of tuberculosis was 16 per 100,000 population, eradication of tuberculosis can be accomplished by frequent reexamination of every tuberculin reactor.

—PAUL C. WILLIAMSON, *executive director, Iowa Tuberculosis and Health Association, Des Moines.*

Developing a Tuberculin Testing Program in Iowa

Jones County, Iowa, in 1954 conducted a mass tuberculin testing program as a pilot study to determine the infection rate among the general population. The Epidemiologic Study Committee of the Iowa Tuberculosis and Health Association, which initiated the project, wanted to gather statistical data according to age, race,

sex, marital status, occupation, and information according to geographic areas such as urban and rural. In addition, the committee was interested in studying the cost of mass tuberculin testing and its effectiveness as a case-finding device in comparison with miniature film screening programs.

The decision of the county medical society to use the Vollmer patch test was based on the belief that it would be more acceptable to the public, that it would be more economical, and that the testing could be accomplished with limited personnel. At the same time, despite the limitations of the patch test, it was believed the survey would determine the infection rate trend in the community, and, in all likelihood, the patch test would not miss a case of tuberculosis in those tested.

A total of 12,392 persons were tested, or 63.8 percent of the 19,401 residents listed in the 1950 census. Of the population above 5 years of age, 69.1 percent were tested. There were 1,266 tuberculin reactors, amounting to 10.2 percent of those tested.

For both sexes, the highest percentage of reactors occurred in the age group 60-64 years. In men, the peak of 30.1 percent reactors occurred in the age group 55-59 years. In women, the highest percentage of reactors reached 22.1 in the age group 60-64 years. The mean age for all reactors was 42.1 years. The mean age for male reactors was 41.6 years and for female, 42.8 years.

The county was organized similar to the pattern used in fast-tempo miniature film screening programs. A receipt-book type of preregistration slip with carbon copies made it possible to keep track of everyone tested. The remaining slips revealed the name, address, and telephone number of those to be tested. Mobile X-ray units were used as interpretation centers. Each reactor was X-rayed at the time of the interpretation.

A registration card was devised to provide statistical information by machine tabulation. The cards were punched and tabulated according to age, race, sex, marital status, occupation, school, institution, and geographic area.

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One section of the full report deals with medical management of suspects following X-ray examination of the reactors. In addition, the follow-through accomplished by the public health nurse is outlined, and a cost analysis is included.

—PAUL C. WILLIAMSON, *executive director, Iowa Tuberculosis and Health Association, Des Moines.*

Treatment of the Nonhospitalized Patient—Advantages and Special Problems

Among tuberculous patients under supervision of the chest clinic of Bellevue Hospital, New York City, 510 have received antituberculosis drugs during the 2½ years since 1953. Nearly half began treatment on the wards of the hospital and were transferred to their homes to complete therapy, which has been continuous and consistent. Other patients were accepted from other institutions or started treatment as clinic patients. Results in this group are less gratifying.

Indications for therapy have been varied. The hospital inpatient service has been utilized when needed for special studies, ancillary services, or for surgical treatment. In this respect, the hospital clinic is well suited to conduct home treatment since hospitalization does not interrupt continuity of supervision. Clinical results have, in general, been consistent with expectations, and it is concluded that adequate treatment can be provided to outpatients when all clinical requirements are met without compromise. Certain groups of patients present special problems which are not easily solved in the clinic. Adolescents and elderly patients fall into this category, as do the occasional uncooperative, recalcitrant patients who are a problem wherever treated.

Best results are obtained when home treatment is begun after careful exploration of personal and social problems, and to this end social services are essential. Provision of diversional activity, rehabilitation services, and education regarding tuberculosis continues to be important but is more difficult for patients scattered

throughout the community than when together under one roof.

Individuals in home contact with patients have been examined and followed. Results are encouraging and suggest that risk is slight when therapy and supervision are adequate.

—FRANCES S. LANSDOWN, M.D., *assistant visiting physician, JULIA M. JONES, M.D., visiting physician, ELEANOR MARTIN, M.D., clinical assistant visiting physician, and JEAN F. HUDDLESTON, M.D., associate visiting physician, all with Bellevue Hospital Chest Service, New York, N.Y.*

Emergence and Distribution of Chromogenic Acid-Fast Bacilli

The full report emphasizes changes in incidence or primary isolations of atypical chromogenic acid-fast bacilli (or new cases of chromogenic infection) and changes in incidence of persistence (or multiple cultures from single individuals) occurring in tuberculous patients and nontuberculous pulmonary patients at the Veterans Administration Center, Wood, Wis.

The period of observation extended from October 1954 through December 1955. For analytical purposes it is divided into 5 successive periods of 3 months each. Two hundred ninety-seven primary cultures were recovered from 6,116 clinical specimens cultured for *Mycobacterium tuberculosis*, an incidence of 4.8 percent.

Results show that, in both groups, changes in incidence of primary isolations undergo seasonal variations which reach their maximum in late fall and early winter, with lesser fluctuations in late spring and early summer. Concomitant cyclic changes also occur in regard to persistence, but only among tuberculosis patients. This phenomenon did not make its appearance in the nontuberculous pulmonary group until the seventh month of the observation period.

One hundred fifty-six cases of chromogenic infection occurred in the tuberculosis patients. Incidence in cases in the last 3 months of 1955

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was 4 times greater than in the same period in 1954. On the other hand, 141 cases occurred in the nontuberculous pulmonary patients. Here, incidence in cases in the last 3 months of 1955 was 8 times greater than in 1954.

One hundred twenty-five cases of persistent infection occurred in the tuberculous group, and 60 cases in the nontuberculous group. In the former, incidence in cases in the last 3 months of 1955 was 26 times greater than in 1954.

To summarize, of the 298 primary cultures for atypical chromogenic acid-fast bacilli recovered from both groups of patients:

45 percent were from patients having treated active pulmonary tuberculosis.

3 percent were from patients having untreated active tuberculosis.

4 percent were from patients having inactive tuberculosis (both treated and untreated).

3 percent were from patients having treated non-tuberculous pulmonary disease.

45 percent were from patients having untreated non-tuberculous pulmonary disease.

44 percent were known to have had, at one time or another, cultures positive for *M. tuberculosis*.

Alarming increases in incidence of new and persistent chromogenic infections are occurring in tuberculous patients and in patients with nontuberculous pulmonary disease. Since our knowledge of the genesis of these organisms and their pathogenicity for man is incomplete, the prevailing situation should be of great concern.

—MARIE L. KOCH, PH.D., *bacteriologist in charge, Clinical Laboratory, Wood Veterans Administration Hospital, Wood, Wis.*

Correlation With Socioeconomic Conditions in New York City

Since the beginning of the antituberculosis campaign in the United States, health authorities have paid special attention to the specific and nonspecific factors that influence the course of tuberculosis. The present investigation of socioeconomic conditions and known tubercu-

losis prevalence in New York City demonstrates one approach to some of the existing community problems in tuberculosis control. The full paper describes and supports with statistical evidence the association of known tuberculosis prevalence with unsatisfactory housing and inadequate income. It was published July 1956 by the New York Tuberculosis Association under the title "Socio-Economic Conditions and Tuberculosis Prevalence in New York City."

During the 3-year period 1949-51, the tuberculosis prevalence rate for New York City, which includes 5 boroughs, averaged annually 369 per 100,000 population. In Manhattan the rate was 665, or 80 percent higher than the overall average, and in Queens the rate was 32 percent lower, or 252.

At the same time, according to data available from the last decennial Federal census, the median family income during the year 1949 was \$3,526 for the entire city and \$3,073, or \$453 less, in Manhattan, but nearly \$600 more, namely, \$4,121, in Queens. In other words, the highest tuberculosis prevalence rate occurred where income was lowest, and the lowest tuberculosis rate was found where income was highest.

The proportion of dwelling units found to be dilapidated or with inadequate plumbing was reported in 1950. As against an average of 9.6 percent of such units for the city as a whole, 18.5 percent of the dwellings in Manhattan were comparatively unfit. But in Queens, the borough with a lower tuberculosis prevalence rate and a higher income, only 4.7 percent of the units were considered to be dilapidated.

It is worth noting that in Manhattan, with the highest tuberculosis rates, 80 percent of the health areas had an average of 200 or more residents per acre. In Queens, 90 percent of the area had fewer than 100 persons per acre. (Health areas are population units, made up of contiguous census tracts, used for vital statistics purposes in New York City. They average about 25,000 persons.)

True, home conditions are a reflection of economic ability to enjoy them. However, the communicable nature of tuberculosis demands

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that contacts with the disease in or outside the home must be under such conditions as to limit its spread.

Unemployment, and consequent limitation of income, brings with it a weighted chain of reduced income, poorer home conditions, and higher tuberculosis rates. In 1950, in the civilian adult population in New York City, slightly less than 7 percent were unemployed (6.9 percent). In Manhattan, where higher rents are demanded, unemployment was 8.4 percent. Again in Queens, with low tuberculosis rates, unemployment was but half (4.3 percent) that of Manhattan.

In like manner, data on the association of the above-mentioned socioeconomic indexes and tuberculosis rates have been compiled for all 5 boroughs of New York City, for the 30 health center districts in these boroughs and their subdivisions, the 348 health areas.

From these correlations in a great population center, it appears that tuberculosis prevalence is closely associated with housing and income.

The supporting evidence leads to the conclusion that, where urban living is accompanied by inadequate or slum housing, low income, and the deleterious effects of overcrowding and poverty, tuberculosis continues to exist at a higher level of prevalence than where the general physical and social environment is salubrious.

—ANTHONY M. LOWELL, M.P.H., director, statistical division, New York Tuberculosis and Health Association, New York, N. Y.

Tuberculin Testing of Honolulu Children

In October 1955 a tuberculin testing project was launched in 26 Honolulu schools. Some 24,000 school children, from kindergarten through high school, will be tested each year for a period of 5 years. The area of the study includes the highest tuberculosis mortality and morbidity rates in the city. Six persons—3 public health nurses plus a practical nurse, a records analyst, and a clerk—are employed full time for the project by the Oahu Tuberculosis and Health Association. Medical direction is

by the chief of the bureau of tuberculosis of the Territory of Hawaii.

In 1930 a tuberculin testing survey in an intermediate school in Honolulu showed a prevalence of positive reactors of over 75 percent. By 1946 the prevalence had declined to 18 percent and by 1955 to 6 percent. These falling rates are part of the background facts which encouraged the long-range study.

Also, the tuberculosis control program in the Territory had received unusually good public support for many years. The relative proportion of beds available for the care of tuberculous patients has always exceeded that of most communities. Intensive case finding through chest X-ray surveys has been in progress since 1942. For a long time approximately one-half of the new admissions to the sanatoriums have been discovered in this way.

In addition, only 6 percent of persons who died of tuberculosis in 1955 were unknown to the health department before their death. The tuberculosis death rate of 55 per 100,000 population a dozen years ago was exceeded by only a few States. Now, the death rate of 6.4 per 100,000 is one of the lowest among the States. Since 1950, the rate has declined 71.1 percent although the number of new cases has declined only 23.4 percent. But the low yield of new cases discovered in the mobile X-ray unit surveys in some areas resulted in a search for more selective surveys and for other supplements to present case-finding efforts.

Some further reasons for studying a different approach to case finding included the occasional discovery of advanced tuberculosis in persons never previously X-rayed, the indifference of some of the population toward X-ray surveys, and the prevailing propaganda that tuberculosis is about finished as a public health problem.

Approximately a year of thoughtful discussion and planning among interested individuals preceded the project. Complete understanding and cooperation were obtained from tuberculosis and health personnel and from representatives of the schools and the medical society.

The technique of administering and interpreting the test has been carefully planned accord-

ing to uniform standards. We use an intradermal dose of 0.0002 mg. of a commercial purified protein derivative. The size of the induration is measured and recorded. An induration of 6 mm. or over is considered positive, but all indurations of less than 6 mm. are also recorded.

Each child in the schools is to be tested each year regardless of whether he had a positive or negative reaction the previous year, but special consideration is given to any child who previously experienced a violent reaction. Accurate records provide a detailed analysis and evaluation of the project as it progresses. Data from the records will be tabulated from machine punchcards. An attempt will be made to observe periodically until he leaves school each child who reacts positively. A file of individuals tested will be maintained, and new cases of tuberculosis reported in the future will be checked against this file.

The project nurses, with some assistance from the bureau of public health nursing, make a thorough investigation for the possible source of the infection in the environment of each child having a positive reaction. Tuberculin tests and X-rays of the people with whom he might have had contact are obtained through either the family physician or the Honolulu chest clinic. The name of the private physician is given on the consent slip signed by a parent of each child tested, and the result of the test, if positive, together with an explanatory letter, is sent to that physician.

The tuberculosis register and the records of the bureau of public health nursing and of the chest clinic are checked for all students who show a positive reaction so as to avoid duplication of effort and to obtain some evaluation of the tuberculosis control procedures already in effect.

The main objective of the project, therefore, is to determine how best to use the tuberculin test in the present control program. We wish to determine the case-finding potentials of the immediate examination of the positive reactors and to search for the source of their infection. We are curious about the feasibility of following up these positive reactors and of maintain-

ing a permanent current record of persons tested against which to check new cases as they are reported in the future. Such a study, properly administered over a period of years, should yield valuable information about the epidemiology of the disease and the significance of infection as well as information about the techniques and logistics of tuberculin testing which could be useful in future control plans.

Some of the data from the project are available in the full paper. About 97 percent of the student population in the project area are being tested. Elementary schools (kindergarten through 6th grade) have a prevalence of 3.6 percent positive reactors; intermediate schools (7th through 9th grade), 8.3 percent; and the high school students (10th through 12th grade), 19.4 percent. Although previously undiagnosed cases are being found, the results so far indicate that tuberculin testing as a case-finding procedure is considerably more expensive per case discovered than the present methods of mass X-ray surveys.

—ROBERT H. MARKS, M.D., *chief, bureau of tuberculosis, Territory of Hawaii Department of Health, and HOLLAND HUDSON, executive secretary, Tuberculosis Association of the Territory of Hawaii, both of Honolulu.*

Effect of Chemotherapy on Long-Term Prognosis

During 1930–40 the death rate from primary tuberculosis on the children's tuberculosis service of Bellevue Hospital, New York City, was over 20 percent. Ninety-five percent of the deaths were due to meningitis and miliary tuberculosis, more protracted forms of hematogenous tuberculosis, and local progression of primary tuberculosis with cavitation and bronchogenic spread. With the advent of streptomycin, the death rate fell to 5 percent and more recently to 1 percent. The ultimate prognosis of the survivors can only be determined by long-term followup.

This has been achieved in over 98 percent of cases treated with specific therapy. Reported

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in the full paper is the present status of survivors in the groups mentioned above who have been followed for more than a year.

—EDITH M. LINCOLN, M.D., visiting physician, children's medical service, Bellevue Hospital, New York, N. Y., and PAMELA A. DAVIES, M.B., and GEORGE I. LYTHCOTT, M.D., both instructors in pediatrics, New York University.

Candida albicans: A Means of Detecting Tubercle Bacilli on Culture Media

In 1954 I reported that a strain of *Candida albicans* which had been isolated from the sputum of a patient known to have pulmonary moniliasis and which failed to grow on Loewenstein's medium had produced a heavy growth of large creamy colonies on this medium when micro-organisms of *Mycobacterium tuberculosis* were present. In that story attention was directed to the fact that colonies of *C. albicans* develop at the sites on Loewenstein's medium in which there are tubercle bacilli.

This observation has been used to detect the early and as yet macroscopically invisible growth of *M. tuberculosis* on Loewenstein's medium inoculated with portions of specimens suspected to contain the micro-organism.

At the Royal Edward Laurentian Hospital, Montreal, during the past year, more than 1,000 specimens have been examined for *M. tuberculosis* by means of duplicate cultures on Loewenstein's medium. One tube in each set of duplicates was superinoculated with a suspension of *C. albicans* cells on the fifth day following inoculation with the material in which *M. tuberculosis* was being sought.

Examination of the superinoculated duplicates disclosed a heavy growth of *C. albicans* in certain tubes within a few days. Acid-fast bacilli were found among the yeast cells in every instance in which a heavy growth of *C. albicans* developed. The average time between the original inoculation and detection of acid-fast bacilli was 15.6 days. Examination of the control duplicates, on the other hand, only dis-

closed macroscopic evidence of growth of *M. tuberculosis* in 4 to 5 weeks.

The superinoculated duplicates also yielded evidence of *M. tuberculosis* half again as many times as the control duplicates. Up to the present time, most of the cultures of acid-fast bacilli that have been detected by means of, and isolated from, *C. albicans* have produced progressive tuberculosis in guinea pigs. However, 14 strains have been found of atypical chromogenic acid-fast bacilli which upon injection cause guinea pigs to become tuberculin reactors but seemingly do not incite progressive disease.

The fact that the superinoculation method yielded a greater number of positive cultures than the routine method indicates that *C. albicans* contains, or produces, a factor which stimulates the growth of *M. tuberculosis*.

A study of the clinical histories of the patients from whose specimens *M. tuberculosis* was isolated by the superinoculation method and not by the routine method disclosed that some of these persons had a positive sputum only on one or two previous occasions and that many either had been given, or were actually taking streptomycin, isoniazid, or para-aminosalicylic acid.

Preliminary in vitro experiments which have been carried out since the described study indicate that *C. albicans* promotes the growth of very small numbers of tubercle bacilli and that tubercle bacilli which have been exposed to streptomycin or isoniazid either fail to multiply or multiply only at a slow rate on standard culture media.

—EDITH MANKIEWICZ, M.D., bacteriologist, Royal Edward Laurentian Hospital, Montreal, Canada.

Mortality Among Former Student Nurses During the Last Decade

Nearly 26,000 former student nurses first placed under observation while in training during 1943-49 participated in a followup study in 1952. The purpose was to determine how many

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had had clinical tuberculosis or had died of the disease.

In the period of observation, 1943-53, during which 186,000 person-years were accumulated by the study population, 96 of the girls died, a rate of 50 for 100,000 person-years, when a rate twice as high was expected. Death rates for the group were much lower during the period of training and the early postgraduate years than were corresponding rates for women of the same age in the general population. Rates increased during the period of observation, and, by the end of the period, deaths from all causes equaled or perhaps even exceeded those in the general population.

The findings for two particular causes of death are of particular interest: The number of deaths from tuberculosis was only one-ninth of the number expected, and deaths from violent causes in the later years of the observation period accounted for two-fifths of all deaths. Motor vehicle accidents alone accounted for 14 of the 35 deaths from violent causes. Overdosage of barbiturates, suicides, and carbon monoxide poisonings accounted for 15 more. If the fatal barbiturate and carbon monoxide poisonings were in fact intentional, suicide would then be the most prominent single cause of death in the study population.

Although nurses undoubtedly are more highly exposed to communicable diseases than the general population, only a relatively small number of deaths were caused by such diseases. Instead, the greatest mortality risks of today's young nurses appear to be from causes not directly related to their professional services.

—ANDREW THEODORE, M.A., ANNE G. BERGER, B.A., and CARROLL E. PALMER, M.D., PH.D., *Tuberculosis Program, Division of Special Health Services, Public Health Service, Washington, D.C.*

The Patient's Reaction to Hospital Treatment

This study explored the range and diversity of attitudes toward hospital treatment held by 570 male tuberculosis patients in the Veterans

Administration Hospital, Madison, Wis. How do patients, in this age of chemotherapy and surgical procedures, feel about undergoing pulmonary surgery? What degree of faith do they have in the antibiotics they are receiving? How do they react to prolonged bedrest in the light of these new treatment methods? What are their feelings toward the medical personnel who are entrusted with their care?

Each patient filled out the Madison Sentence Completion Form, an attitude form designed specifically to evaluate the thoughts and feelings of hospitalized tuberculosis patients. In completing the 80 sentences of the form, the patient has an opportunity to express his reactions to bed rest, surgery, and other pertinent aspects of his treatment program. Analysis of responses revealed the following:

There does not appear to be a uniform set of attitudes held by all tuberculous patients. Individual differences in personal reactions and intensity of feelings are striking.

Bed rest tends to place an emotional strain on the majority of patients. Restlessness, depression, nervousness, boredom, and feelings of helplessness are frequent complaints. On the other hand, many patients are able to adjust adequately to long-term bed rest. A minority of bed resters express the feeling that they "never had it so good."

Many patients have marked difficulty in accepting their enforced dependency on the hospital staff. The majority, however, regard their dependency state as necessary for cure and appreciate the help given them.

Most patients indicate confidence in the effectiveness of the antimicrobial drugs and state they have benefited noticeably. Complaints about the disagreeable taste of para-aminosalicylic acid and the discomforting side effects of other drugs are not uncommon.

About half of the patients are willing to undergo pulmonary surgery if it is prescribed. Surgery is generally viewed as a means of speeding up recovery. Strong fears in regard to the operation often attend the acceptance or rejection of surgery. Many patients are either unwilling to reach a decision or indicate that they will turn down surgery.

Most patients do not appear upset when hospital personnel and visitors wear masks. Instead, they recognize and appreciate the mask's value as a protective measure. A minority react negatively to the wearing of masks, feeling that it enhances the stigma of the disease.

Patients invariably prefer a physician who is professionally skillful, who explains their medical condition to them in a frank, compre-

hensive, and understandable fashion. On the other hand, most patients prefer nurses for their friendly, personal qualities rather than for their professional competence.

Despite the many frustrations of hospitalization, most patients feel optimistic about the future.

—GEORGE CALDEN, PH.D., *chief psychologist,
Veterans Administration Hospital, Madison, Wis.*

An Important Date



Each month your health department and many hospitals, laboratories, schools, clinics, and homes receive a copy of PUBLIC HEALTH REPORTS, mailed to arrive on the 20th, or even earlier, depending upon geographic location of the subscriber.

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Health Services for Children of School Age

IN school health services, as in the infant and preschool area, the Working Group on Service Programs recognizes wide variations in program content, stages of development, and available facilities in agencies providing school health services.

The Working Group on Service Programs recognizes also that changing concepts and new approaches are vital to the attainment of goals in health programs for school-age children. In view of the fluid state of school health services, it was considered neither desirable nor possible to prescribe specific statistical patterns applicable to all school health programs. Consequently, the proposals of the working group should be regarded as a framework within

which each school health agency may develop a statistical program in accordance with its own needs.

PREREQUISITES

The following conditions must exist if meaningful service statistics are to be developed for a program of health services for school-age children.

1. The objectives and scope of the program must be clearly defined.
2. Education personnel and health program personnel, such as physicians, nurses, nutritionists, social workers, health educators, and statisticians, should have a part in determining the

Service Statistics

The Working Group on Service Programs of the Public Health Conference on Records and Statistics is issuing a series of documents on the collection and analysis of statistics recommended for various health department service programs. As these recommendations are completed and approved by the working group and the conference, they will be published.

An introduction to the series and the basic principles governing service statistics appeared in June 1956, page 519. These were followed in the July issue, page 705, by a statement on service statistics for the health supervision of infants and preschool children.

In developing this statement, the third in the series, the Working Group on Service Programs had the assistance of Dr. Alfred Yankauer, director, maternal and child health services of the New York State Department of Health, as medical consultant.

This report was approved by the conference membership in May 1954. It has been reproduced in mimeographed form as attachment A to document

312 by the National Office of Vital Statistics, Public Health Service, Department of Health, Education, and Welfare, Washington, D. C. Under the title "Guide to the Collection, Analysis, and Interpretation of Service Statistics in Health Services for Children of School Age," it has been endorsed by the Association of State and Territorial Directors of Local Health Services, the Council of State Directors of Public Health Nursing, and the Statistics Section and the Committee on Administrative Practice of the American Public Health Association.

Concurrently, with the development of this statement, the Committee on School Health Service Statistics of the School Health Section of the American Public Health Association was also addressing its attention to fallacies in the way school health statistics are often kept. The report of this committee was published in the *American Journal of Public Health*, May 1956, page 636. Interlocking membership of the two groups was arranged in order to assure basic consistency in the respective statements.

kinds of information needed and in developing plans for its collection. The statistician should function as a member of this professional team in initial planning of the program as well as in program operation and evaluation.

3. The information required should be clearly understood by, and should be acceptable to, medical and dental societies and other participating personnel and agencies.

4. The purpose to be served by the statistical data should be clearly specified. Reports should be prepared only to fulfill specific purposes.

5. Provision should be made in advance, during the initial planning stage, for periodic evaluation of statistical procedures.

6. Statistics developed for health services to school-age children should be correlated with statistics developed for related programs of the health department. One means toward this end is to have a records committee periodically pass on and review basic statistical forms of the several programs.

Other factors involved in effective evaluation which cannot be totaled and tabulated, such as local physicians' cooperation, availability of adequate facilities and qualified personnel, and attitudes and habits in relation to health, must be borne in mind.

BASIC CONCEPT AND OBJECTIVES

It is generally accepted that a program of health services for school-age children should consist of three major segments: health instruction, maintenance of healthful environment, and health services. This report is confined to suggestions for the development of statistics related to health services. School health services may be provided by the health department, by the board of education, or, in some instances, by another agency.

The emphasis in school health programs has changed from merely finding and correcting physical defects to the health appraisal of children as individuals, the solution of their overall general physical and emotional problems, and the education of the child and family in healthful living.

It is agreed that health programs for children of school age should be sufficiently broad

in scope to include not only services for children in public, private, and parochial schools but also services for school-age children who, for health or other reasons, are not in any school. Information should be available on the services provided for each group.

It is recognized that data on the child not registered in school may be difficult to obtain, but, when such information is available, it is desirable to include it in administering a program. Possible sources are records from public health nursing offices, crippled children's services, and special clinics.

Because of the many variations in school health programs, no standard pattern of services prevails. However, it is possible to set forth basic objectives toward which all programs are directed to a greater or lesser degree. These objectives may be stated briefly as:

1. Finding children in need of medical or educational observation, counseling, and treatment by:

Observation by teacher or nurse.

Appraisal by physician and dentist either through school health services or through some other source.

Nonmedical screening (vision, hearing, dental inspection in school, height and weight measure, health inventory) and self-referral.

Absence from school or nonregistration.

2. Followup (and continuation of followup) of child in need of care to the point of definitive diagnosis or to the point of receiving care, and giving care where it is within the scope of the program. Examples are:

Observation by teacher or nurse.

Examination by school physician.

Counseling by nurse, physician, and others that child seek service or treatment.

Examination by specialist or consultant.

Provision of immunization.

Medical or dental treatment.

Provision of special education service.

Obtaining report of service provided.

Implementation of report, if further service is indicated.

3. Minimizing the hazards of school attendance by means of communicable disease control and accident prevention.

4. Provision of emergency service, such as care of injured or sick in school.

5. Health guidance and counseling through contacts with children, parents, teachers, and community agencies.

STATISTICAL INFORMATION

To determine whether the school health service is meeting its objective, extensive statistical data are needed for planning, administering, and evaluating the operation of the program. The following types of information are suggested for these purposes.

For Planning a Program

Baseline data against which to measure progress in provision of health services are essential. The data suggested below for planning a program should be subdivided, if applicable, according to type of school (public, parochial, or private) which the children attend; or whether they are in hospitals or similar institutions; or whether for some other reasons they are not in school. The data should also be subdivided by agency administering the program and by type of service provided.

1. Population of school-age children by age or grade (or by ungraded classes), sex, and color (where significant).

2. Number of children in entering school population, by grade (or by ungraded classes).

3. Estimates of the future school population.

4. Socioeconomic characteristics of the population by geographic area as indicated by pertinent census data and by intercensal data such as general opinions of school principals, teachers, and nurses; special studies; welfare data; and other health department data.

5. Legal and administrative requirements affecting the school health program.

6. Morbidity and mortality data, by age and cause.

7. Information identifying existing health and medical facilities and personnel and other health resources in the school system and in the community, which would be available through the health department, board of education, other public agencies, voluntary health agencies, and private medical practitioners.

For Administering a Program

The customary daily report of physicians and nurses, which shows the number of examinations given, conditions found, and corrections made, tells little about what has been accomplished and what needs to be done in any classroom. Not all conditions can be corrected, and

not all corrections relate to conditions found upon original examination. The best the health service can do is to get the children under medical supervision. The number of corrections recorded for a current year cannot be directly related to the number of conditions found because the former may be the outcome of an examination in a preceding term or year. A statistical report of corrections, unless related to group examined, fails to reveal the actual service received. For administrative purposes, however, a summary of current information, by geographic area when indicated, is needed.

For the reasons stated, information similar to the following frequently is required, in addition to the baseline data previously enumerated for planning a program.

1. Number of children referred through observation of teacher or nurse.

Practically every school child is observed to some degree for health status by the teacher or the nurse.

2. Number of children examined, with or without the parent being present, by the school physician, by a private physician, or by some other physician; and number examined by the school dentist, by a private dentist, or by some other dentist.

The following information should be organized by the type of agency (board of education, health department, or other) and by the type of physician or dentist providing the service.

Entering children: Number found with and number found without conditions needing attention.

Reexamination of selected grades: Number of children found with and number found without conditions needing attention.

Referral examination by source (specify) of referral: Number of children found with and number found without conditions needing attention.

3. Number of children screened and referred by nonmedical procedures.

Specify type of procedure: Number referred and number not referred for further examination.

4. Distribution of children examined, by health status (with or without health needs), color, sex, and age or grade:

Number of children examined or observed.

Number of children for whom further attention is indicated.

Number of children with conditions, single or multiple, needing attention.

Number of children not needing any further attention.

Number of children, and percentage of total children examined or observed, in specified diagnostic groups.

5. Distribution of children with and without health needs by method of finding.

Breakdown according to:

Medical examinations (whether new admission, re-examination, that is, periodic additional examination, or whether referral by teacher, nurse, or parent).

Screening.

Teacher observation.

6. Types of conditions most frequently needing attention, such as nutritional, vision, cardiac, skin, ear, and orthopedic conditions, or behavior problems.

These might be listed according to:

Static handicap (such as club foot) which should be noted.

Handicap which needs attention but which is not receiving it.

Handicap which is receiving attention but which should be followed to see that attention is continued.

7. Diagnoses showing statistically significant differences observed in color, age, and sex groups, or for other important variables; for example, economic status and geographic location.

8. Statistics relating to the volume of other services, such as immunizations, dental services, first aid.

These data need not be collected routinely but may be the basis for special study.

9. Statistics of services not rendered; for example, services which are planned but which are not possible to provide, and the reasons why.

10. Statistics of followup services for children found by the several casefinding methods.

These data have to be obtained on a longitudinal basis, that is, over a period of time.

11. Counts of some educational services, such as number of nurse conferences with school staff, teacher-nurse conferences, talks to community groups.

These items do not measure quality, but they do tell what is being done with respect to selected aspects of the program. It is not necessary, however, that complete information of this kind be kept constantly. The desired in-

formation may be obtained through special studies at selected time intervals.

12. Data on a number of special services that may or may not be administered by health or education departments.

These are the services provided for handicapped children of school age and the services provided by cardiac and tuberculosis clinics. Data on such services should be correlated with regular school health statistics.

13. Summary of results of previous findings.

As a supplement to the types of current reporting listed in paragraphs 1-12, a summary of the action taken is also suggested. For a particular group examined in the previous year, a summary record would reveal whether the children who needed attention received it during the 12-month period following the examination. Summarized information of this type gives a more satisfactory picture of the accomplishments of the program and what remains to be done than does a detailed count of conditions found and corrected within a current year.

14. Analyses of absences by type of illness and length of absence.

Absentee records are a potential source of useful data for indicating preventive measures and needs for services and for reflecting acute and chronic conditions. Absentee records would be analyzed only as a special study, especially when the absences are repeated or long-term absences occasioned by illness. It is important to know the reasons for absence, to know how many conditions received attention, what are the needs of children who did not receive care, how much absenteeism could have been prevented, and to what extent absenteeism might have been shortened.

15. Data on the types and results of accidents.

Inasmuch as accidents are the leading cause of death among children of school age, accident statistics, if they are to be complete, should contain information on the nature of the accident, part of body injured, how, when, and where the accident happened (supervised or unsupervised play), treatment given, followup needed, days absent, and whether a physician was required. Accident data are valuable for planning educational programs of accident prevention and correcting the conditions which lead to the occurrence of accidents.

For Evaluating a Program

The working group believes that analyses of results of medical examinations, case-finding services, and followup data would be more valuable than many unrelated statistics currently being accumulated. In addition, periodic analysis of the school health record of each child is desirable. It is not necessarily recommended that the entire program of school health services should be evaluated routinely. Detailed analyses are generally more useful when handled as a special study.

Medical Examination

Studies of records of medical examinations can provide indexes of health needs. Analyses of physical defects by type and severity of condition can provide data useful both in indicating preventive measures and needs for services. In considering medical examinations as an index of health needs, it should be borne in mind that the diagnostic findings of the school physician's examination cannot always be definitive and that his examinations may not cover that portion of the school population examined by private physicians. Moreover, records and reports of the private physician may not be comparable with those of the school physician.

Case-Finding Services

Information and data of the following type are useful for analyzing case-finding services:

What was the source of finding the case?

What was the type of condition found?

Was the needed service provided? (This is useful information both for evaluating the program and for indicating gaps in community services.)

How many conditions found for the first time in reexamination might have been found earlier (either by a more careful referral program or at the time of a previous examination)?

How much over-referral and under-referral resulted from nonmedical screening or teacher observation?

Followup Data

Information regarding followup activities and the results obtained from followup are probably the most revealing index to accomplishments of the school health program. The

final results of followup, or some record as to whether the condition is in need of followup, should always be clearly stated in the basic record. At the time of a reexamination, current findings should be reviewed to determine what services the child has received as a result of the findings in the previous examination.

Information on the health status of the child, based on his condition at an interval after the initial finding together with an accounting of what has been done in the interim, is valuable for program planning and operation. This type of reappraisal after reasonable followup provides a measure of evaluation of the services provided.

A periodic review of individual records, annually if possible, is a better source of material for evaluating services performed and the results obtained than the compilation of daily reports of physicians' and nurses' activities. Records of children needing further attention should be analyzed more frequently than records of other children.

School Health Record

Inasmuch as the ultimate goal of a health program for school-age children is better service for the child, it is important to have a separate health record for each child. Because successful evaluation of the program is dependent on the extent to which necessary information is available, the school health record should be designed to provide information on the type of service provided and on the findings, and to give specific recommendations for further services based upon casefinding and followup, illness and accident data, and pertinent absentee data.

TABULATION METHODS

The following methods are suggested for tabulating program statistics. They may be used in combination.

Manual methods. Abstracting information by manual sorting and counting individual case summary cards, or tally sheets, is applicable to small health departments, but these methods do not lend themselves easily to correlation of information.

Marginal-punched, hand-sorted cards. This

method permits ready analysis where the volume of service is not large enough to justify mechanical tabulation.

Mechanical tabulation. This method is practical in health departments with a large volume of services.

POINTS FOR EMPHASIS

Advance planning for the collection of data is an important aspect in the accumulation of meaningful statistics. Program directors, nursing personnel, statistics staff, field personnel working with the records, school administrators, and teachers should be included in the planning. Within the program area there should be clear understanding of the definitions and need for uniformity in recording and reporting. Particularly is it important that local medical and dental societies have such understanding.

Final responsibility for decisions regarding terminology and classification would seem to rest with program directors working with the education and nursing personnel, statistics staff, and members of the field staff who use the records.

Statistical approaches to health needs of children of school age are complicated and should be undertaken as a well-defined study. For statistics to be meaningful, an adequate followup system should be provided, and a concise record should be maintained of the service rendered. In analyzing school health data, one area of information at a time should be mapped out for study. As the usefulness of the collected information is determined, specific items can be continued or dropped as indicated.

Compilation of all service statistics on a school-year basis is recommended for comparison with baseline data. Where these statistics are required for fiscal purposes, compilation on a fiscal-year basis should supplement, but not substitute for, school-year data. The working group cautions against more frequent tabulations than are justified by use.

With the trend toward having children examined by the family physician instead of by a

physician employed by the school or health department, the collection of statistics on conditions needing attention becomes even more difficult. Accurate sampling studies within a school health service are believed to be more fruitful than the year-by-year accumulation of meaningless numbers of different categories of conditions. Cooperation with local and State medical societies is important in making the special studies. Special studies done on a sampling basis, when indicated, are recommended as a device to reduce the number and complexity of routine reports wherever possible. Routine reports should concentrate on minimum essentials for reflecting program activities and should avoid over-refinement of data.

The working group believes that the frequency with which specific reports should be compiled must be determined locally, depending on uses to be made of the data. It recommends that unduplicated counts of school-age children served would be most meaningful when tabulated annually, on a school-year basis if possible.

Statistical measurements of service should be interpreted in relation to baseline data, needs for services, and program objectives. Only thus can an approach be made to evaluating accomplishments of a program.

Traditionally, age breakdowns have been regarded as providing an essential basis for determination of health needs. The working group believes, however, that insofar as school health services are concerned a grade classification would be more practical administratively, inasmuch as records are usually kept by grade, and little is lost in the way of age classification. Some general information on range of ages by grades and by various types of schools should be available, however, so as to relate school health service statistics to other available statistics.

In formulating this statement, the working group has emphasized throughout the importance of data analysis as well as data collection. The group believes that, for maximum utilization of service statistics, further expansion of this phase of statistical study should be carried out through the team approach.

For health workers, students, and others unfamiliar with techniques of industrial hygiene, a definition of terms and an explanation of the procedures in the technology of air sampling are contained in this talk presented to the chemical section of the 43d National Safety Congress and Exposition, Chicago, October 18, 1955.

Some Basic Principles and Problems of Air Sampling in Industry

By CHARLES D. YAFFE, M.S.

INDUSTRIAL HYGIENE is concerned with everything in the working environment including, of course, the air surrounding the worker. That air, in addition to its normal constituents, may contain foreign substances or contaminants in solid or gaseous form. Unless it is prepared specially in the laboratory, air always contains some contaminants, so it is not strictly correct to say that air is "normal" only when it is "pure." One of the objectives of air sampling is to determine how much of a given contaminant is present in the working atmosphere.

Types of Airborne Contaminants

Airborne contaminants may all be classified chemically. They may be further sorted into

Mr. Yaffe, chief, Program Services, Occupational Health Field Headquarters, Public Health Service, Cincinnati, is also one of the technical editors of the Encyclopedia of Instrumentation for Industrial Hygiene, published April 1956 by the University of Michigan in cooperation with the Public Health Service.

two major groups, depending on whether or not they are living matter, such as bacteria, viruses, or molds.

In addition to finding impurities of a chemical nature in air, we also encounter various forms of energy such as light, sound, and radioactivity. These are also parts of the working environment that are of interest to the industrial hygienist. Again, as with airborne substances, these are normally present everywhere, and our interest is primarily with "how much." The measurement of these energy forms, which are sometimes referred to as physical agents, is a broad and complex subject outside the scope of this present discussion, which will be limited to the airborne contaminants referred to as chemical agents.

The methods employed in measuring the amount of a contaminant will depend on the form in which it exists in the air. The forms in which contaminants are found in the air may be classified as dusts, fumes, gases, vapors, and mists.

Dusts and fumes are solid particles which differ in their size and method of production. Dust is produced when solid material is broken up by such operations as crushing, grinding, drilling, and blasting. Fumes, on the other

hand, are formed by the condensation of solid substances which had been vaporized by heat, such as would occur in welding or furnace operations of various types.

Dusts are generally larger in size than fumes although there are no definite size limitations for either. Large dust particles usually do not present serious hazards to health because, first, since they tend to settle to the ground quickly, they are less subject to inhalation, and, second, if they are taken in, they are usually trapped in the nose and seldom penetrate into the respiratory system to a point where they may remain long enough to cause injury.

Ordinarily, for health purposes we are interested in dust particles smaller than 10 microns in size. A micron is 1 millionth of a meter or approximately 1/25,000 of an inch. A 10-micron particle is about the smallest that can be seen with the naked eye. Most of the dust that is our concern has been found to be between about one-half micron and 3 microns in size although the electron microscope has shown the frequent presence in the air of many smaller dust particles. The electron microscope has also shown that more of this very fine material is retained in the lungs than was formerly believed.

The size range of dust particles produced by industrial operations will vary, depending on both the process and the material involved. The average or median size of industrial dust as determined with the ordinary optical microscope is usually fairly close to 1 or 2 microns.

Fume particles are generally smaller in average size than the dust particle; the maximum size is usually below one-half micron. Fume particles can join together, however, so that with time the average size may increase after formation.

Gases include those elements and compounds that are found only in gaseous form at ordinary temperatures and pressures. Oxygen, nitrogen, carbon monoxide, carbon dioxide, and chlorine are well-known examples.

Vapors are the gaseous forms of substances that also exist in liquid form at ordinary temperatures and pressures. Common materials of this type are water, gasoline, carbon tetrachloride, benzol, and mercury.

Mists are droplets of liquids, produced either

by atomizing, as in spray painting, or by condensation, as with water that becomes fog or steam. Because mists are particulate in nature, they may sometimes be collected with the same kind of instruments used for dusts or fumes.

My remarks here omit any discussion of the sampling of airborne micro-organisms, such as bacteria, except to mention that they are often of the same size range as dusts and fumes. Though sampling instruments for those particulates often are capable of collecting airborne micro-organisms, some of the instruments kill the organisms and are therefore considered undesirable in biological sampling studies.

Appraisal of Health Hazards

Before discussing actual sampling methods, we might ask, "Why analyze the air?"

Air often is analyzed for purposes other than to determine health hazards. Industry frequently samples the air in certain locations to determine the presence of leaks which could represent a loss of valuable material or of a fire hazard, an explosion hazard, or a nuisance to the neighborhood. Smoke is measured to determine whether an operation is contributing to a community air pollution problem as well as to find out whether fuel is being utilized efficiently. Information obtained when sampling for one purpose can often be of considerable value for other purposes. For example, concentrations of poisonous materials that are low enough to be breathed safely for an 8-hour work period are without exception far below the lower explosive limit. In other words, if the health hazard is controlled, the explosion danger is eliminated too.

The sampling of air for so many purposes means that the associated problems have been approached independently by various groups, each having different aims, backgrounds, and viewpoints. The resulting interchange of ideas has been beneficial to all concerned. Principles developed for one objective have often turned out to be exactly what was needed to achieve other objectives.

Now, let us consider specifically some of the methods and problems connected with the appraisal of health hazards. The first question is, "How much is too much?" This has always

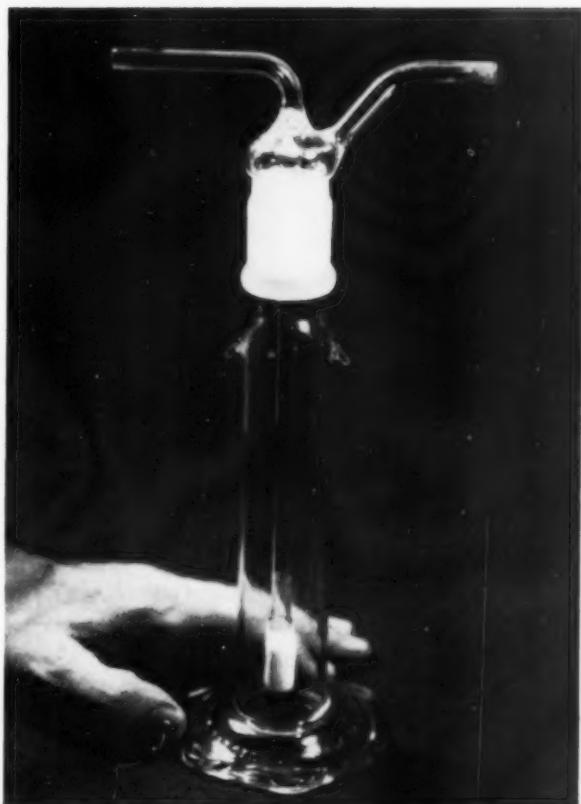
been and probably will continue to be difficult to answer for a long time to come.

It is not a simple matter to determine how toxic a substance is, particularly when the avenue of attack is through the lungs. This is true for several reasons. One is that the amount inhaled will vary according to how much physical effort is involved on the job. A man doing heavy work will require much more air than a man in a sedentary job, and he will, therefore, take in more of any contaminants in the air. Another problem, with dusts, is that the amount penetrating into the lungs depends on the size of the particles. Another complicating factor is the sometimes considerable variation in individual susceptibility. Two men may work side by side for many years in a dusty atmosphere. One may eventually die of silicosis while the other never develops any measurable disability attributable to the dust.

The range of variation is extended even further when we include the person who has an allergic response to even minute amounts of a substance. Another important complication



Evacuated bottle for air sampling.



Fritted bubbler.

arises when a contaminant has more than one possible effect. For example, suppose it is found that a great number of people work with a given material without discomfort or evidence of injury provided the concentration of the substance in the workroom air is kept below a certain point. Let us assume, however, that an analysis of the death certificates of people who had worked with the material reveals that the cancer rate among the group is twice as high as for people who did not handle the material. The question then arises, "Did this material cause the increase in the cancer rate?" If, and this is sometimes a big "if," the relationship is clearly proved, the next and more difficult question is, "How much of this material is necessary to cause cancer and how long must the period of exposure be?" Fortunately, most materials do not present such complex problems.

We frequently do have the problem, however, of distinguishing between what is acceptable exposure for short periods of time and what is the maximum amount of the substance that can be safely tolerated 8 hours daily, 5 days a week,

and, where community air pollution is involved, 24 hours a day for an indefinite period.

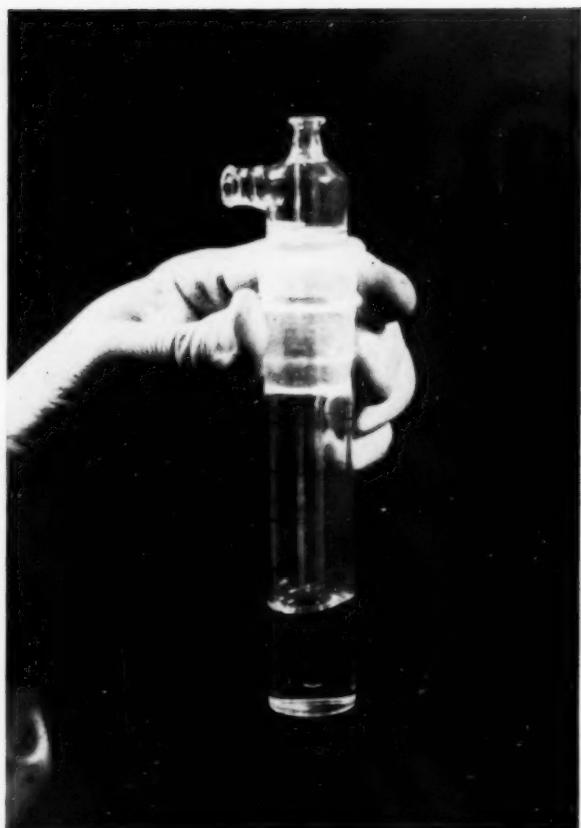
Negative and Positive Data

Toxic materials do not all act in the same fashion. Some may be stored in the body until a certain excess is accumulated, whereupon the individual suddenly develops symptoms of toxicity. Other materials may be eliminated without injury occurring unless the initial dose is large enough to cause immediate effects. Still others may cause definite harm directly in proportion to the amount absorbed. Recovery may or may not occur, depending on the nature of the damage inflicted.

Actually, despite the difficulties in working out recommended standards for substances, much useful information has been developed for a number of elements and compounds, and reasonably satisfactory benchmarks have been established for many others. Each year our knowledge becomes more precise. The infor-



Carbon monoxide sampler.



Midget impinger.

mation comes both from laboratory research on animals and from practical experience in the field where the safety factor is put to the test by people at work.

It is here that air sampling provides its maximum usefulness whether the environment is hazardous or not. It is as important to measure what is safe as to measure what is dangerous, for the objective is to provide healthful surroundings, and these must be defined. For this reason, negative data are at least as valuable as positive data.

Since different substances have different toxicities, the amounts that are dangerous will differ. The quantities involved where air sampling is concerned, however, usually have one thing in common: The actual amount collected and available for analysis is extremely small. More precise techniques than those ordinarily needed in analytical procedures, therefore, often have to be employed.

I am reminded at this point of 99.44 percent purity. Let us consider the 56 one-hundredths

of 1 percent of an airborne impurity such as, say, carbon monoxide. Concentrations of gaseous contaminants are usually expressed as parts per million. One percent equals 10,000 parts per million; therefore, 0.56 percent is equal to 5,600 p.p.m. A person breathing air containing that much carbon monoxide would die in less than an hour.

The maximum acceptable concentration for carbon monoxide for an 8-hour exposure is 100 p.p.m., or 1 one-hundredth of 1 percent. Thus, so far as carbon monoxide is concerned, the air must be at least 99.99 percent "pure."

While carbon monoxide is a dangerous adversary, which must be treated with great respect because it is odorless and colorless, there are other far more poisonous gases. The allowable limits for arsine, phosphine, and ozone, for example, are much less than 1 p.p.m.

Size and Type of Sample

The amounts of some solid materials which must be measured as dust or fume are also exceedingly small. As an example, the recommended limit for 8 hours' exposure for cadmium is 0.1 milligram per cubic meter of air. Or, in units easier to visualize, the limit would be approximately 1 ounce in 10 million cubic feet of air. Fortunately, analytical techniques do not call for an ounce of material. Sampling equipment capable of handling 10 million cubic feet of air in a reasonable time interval might lack portability, to say the least. As a matter of fact, laboratory methods are so sensitive that we can readily determine whether the limit for cadmium is exceeded by analyzing the amount removed from 20 to 30 cubic feet of air. The same is true for most other particulates.

The amount of a contaminant in the workroom air may vary considerably during the cycle of operations. Consequently, we are often interested in extremes of exposure as well as in the average exposure since very high concentrations for a short time may sometimes cause trouble even though the average for the day is not excessive. Therefore, we need to collect two different classes of samples: one for long periods to measure the average exposure, the other for short periods to give information about the fluctuations in concentration.

The time required to obtain an accurate evaluation of the average exposure will, of course, depend on the length of the operating cycle, on variations in production rates, and so forth. The average concentration of vapor around a cleaning vat where parts, all of one type, are carried on a conveyer at a uniform rate might be determined satisfactorily from an hour or so of sampling whereas an operation of an intermittent nature and of varying workload might require a number of samples collected over a period of days or even weeks, and, in some cases, the collection of single samples for hours or even days.

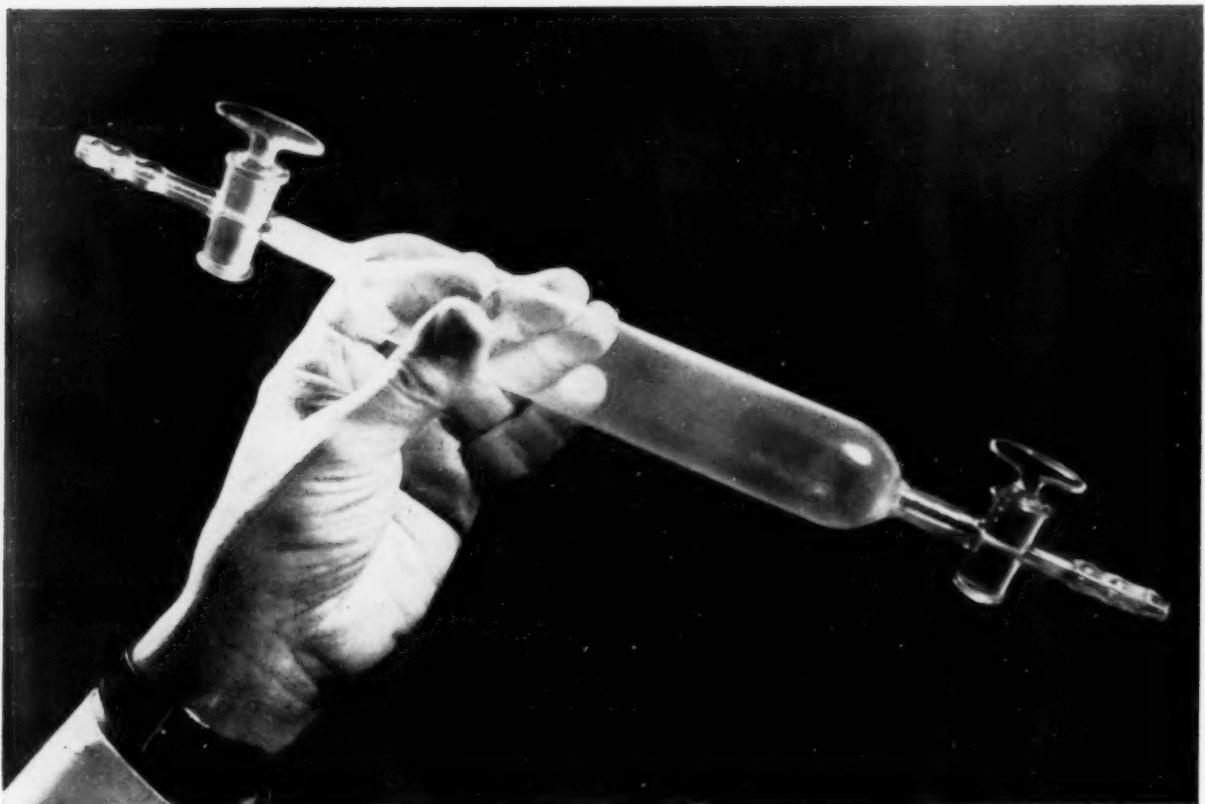
The time interval employed in the individual samples collected for measuring fluctuations in concentration depends on needs and also on the instruments employed. Some devices used for such purposes collect what are variously called "instantaneous," "snap," or "grab" samples. With these the volume of air sampled is small, ranging usually from a few cubic centimeters to the amount held by a small bottle or flask. Ordinarily, a few seconds or less is sufficient time to collect grab samples. Where large volumes of air must be sampled to get enough material to analyze, equipment designed for long-period sampling may be employed for the shortest time interval practical in the circumstances.

Ideally, a sampling technique should give an immediate answer. A number of instruments and methods which do give desired information instantaneously or within a few minutes have been developed, and the prospects are bright for more equipment of this type. At present, however, measurement of most airborne contaminants requires the collection of samples which must be returned to the laboratory where hours or even days of processing are required to yield the answers.

Types of Instruments

I will not attempt to describe in detail the many types of instruments used in air sampling. Generally, however, they have a source of suction to draw the air through some type of collecting or analyzing device and a means for measuring the volume of air sampled.

If a sample is to be collected continuously over a fairly long period to evaluate average con-



Gas sampling tube.

ditions, or if we wish to sample a relatively large volume of air, we would probably use a motor-driven pump. In atmospheres where the possibility of explosion must be considered, we would probably avoid using electrical equipment and use compressed air or hand-operated pumps instead. The sampling rates employed seldom exceed 2 or 3 cubic feet of air a minute and often are less than a tenth of such rates. Rotameters, pressure gauges, orifice meters, or other appropriate metering devices, may be used to measure the air flow.

The collecting mechanisms employed are numerous because of the variety of contaminants. Particulate material, such as dust, might be collected on one of the many filtering materials in common use or might be picked up by an electrostatic or thermal precipitating device. Another common technique employs impingement. The choice of collector would depend also on whether the dust is to be weighed, counted, measured for size, or subjected to chemical analysis.

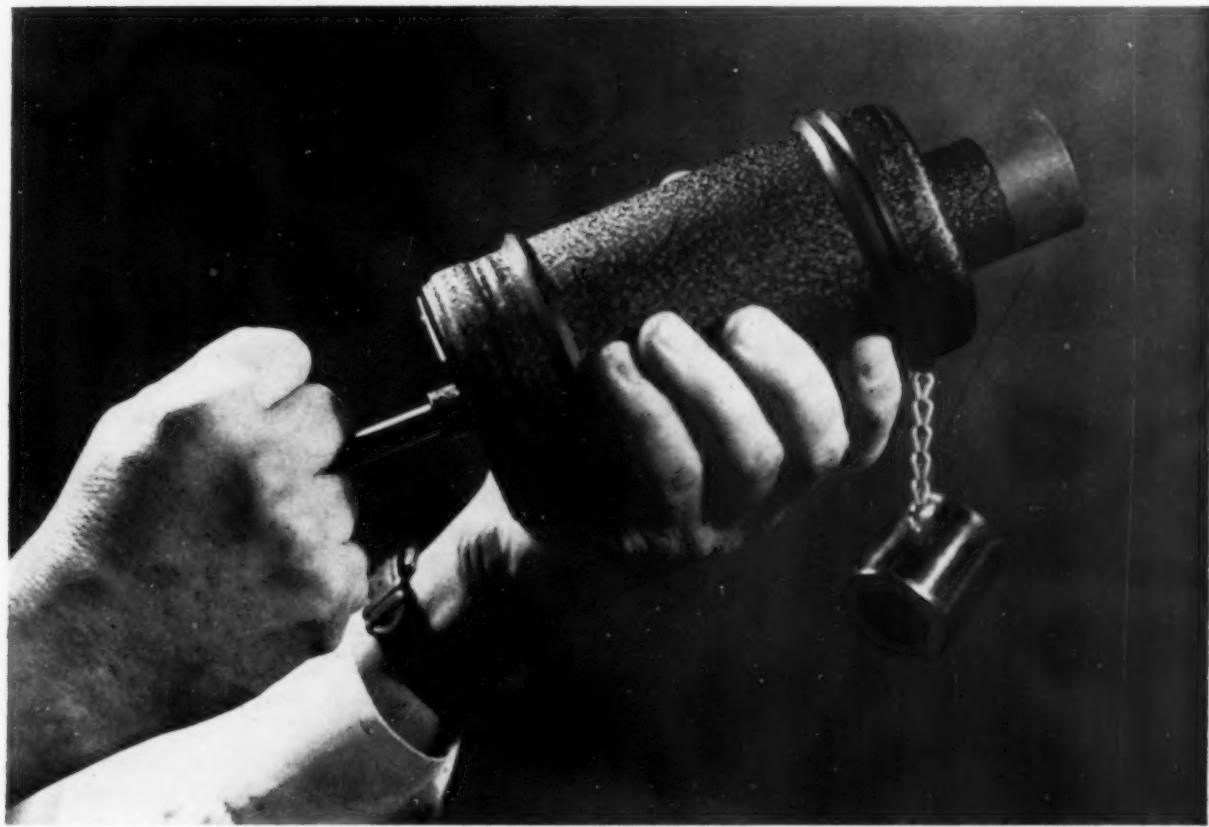
Gaseous matter might be absorbed by bub-

bling it through a suitable collecting liquid or by adsorbing it on such material as activated charcoal or silica gel.

Instantaneous or grab-type samples of gases might be collected in bottles or flasks which are first evacuated in the laboratory and then opened at the sampling point. Another technique is to displace the air in a double-inlet type of bottle, usually with a hand-operated pump or rubber aspirating bulb. A simple procedure is to fill the bottle with water; as the water drains out, it is replaced by the air to be sampled.

Sampling devices of various types are pictured in the accompanying photographs. They all have two features in common: small size and simplicity of operation.

As stated before, the preferred instrument is one which gives an on-the-spot answer. Among interesting instruments of this type are simple devices in which air is drawn by means of rubber aspirating bulbs through tubes of chemicals; the chemicals develop immediate color changes proportional to the amount of specific contaminants present. Tubes containing chemi-



Hand-operated pump for filter sampler.

cals are available for measuring carbon monoxide, hydrogen sulfide, hydrogen cyanide, and possibly other gases. Oxides of nitrogen may be measured in the field by collection in large hypodermic syringes and comparing with standards the color developed when suitable chemical reagents are added.

Other more complex devices for obtaining answers in the field utilize some physical characteristics of the contaminant in question. One group of instruments utilizes the principles of combustion. For example, vapors that are combustible may be burned on a heated platinum wire in a balanced electrical circuit. The vapors, in burning, raise the temperature of the wire, increasing its resistance, and the change is measured with a galvanometer. Since such instruments are not specific, it is necessary to calibrate the instrument for the particular contaminant.

Certain substances such as the vapors of mercury and of some chlorinated hydrocarbons will prevent the transmission of ultraviolet

light. This property is utilized in some instruments by measuring the amount of ultraviolet absorption. The measurement is indicated on a dial.

Some instruments indicate the number of dust particles in the air. These devices are usually based on a measurement of the amount of light scattered by the dust. Even though they have certain defects, they are useful in determinations of dust of uniform particle size.

Recording devices are being employed with increasing frequency to provide a permanent record of the air conditions measured continuously at a specific location. When attached to suitable instruments, recorders show the fluctuations in concentration which take place and, when compared with concurrent work records, often indicate where control measures or changes in operating methods are advisable. Recorders operate on various principles, for example, changes in electrical conductivity produced by absorption of such gases as sulfur dioxide.

Maximum and Specific Limits

Before concluding, I should like to return to the subject of limits since air sampling to determine health hazards usually requires a decision by authorities that a hazard is or is not present, and, should it be present, they must also decide how serious it may be.

For many years there have been figures known as M.A.C. values with M.A.C. standing for "maximum allowable concentration." The expression has often been a center of controversy because of differing viewpoints concerning interpretation of the values. In jurisdictions where lists of M.A.C. values are part of legal regulations, some administrators have operated on the basis that any sample showing an M.A.C. to be exceeded is a violation. Similarly, I suppose, so long as the M.A.C. is not exceeded, the interpretation would be that no problem exists.

Actually, of course, the question is not so simple. As I stated earlier, although we now have fairly satisfactory toxicological information about a number of substances, the limits in common use do not necessarily represent similar degrees of hazard. Some limits are established to prevent serious injury or possible death. Others are to prevent concentrations that would be irritating to breathe, though not necessarily dangerous. Still others are to prevent levels of odor that are disagreeable. The degree to which people can tolerate or to which they are at all disturbed by such conditions varies greatly, and it is not possible to determine exactly how much of their disturbance is psychological rather than physiological, nor is it correct to dismiss the psychological condition or effect as unimportant.

Most people experienced in industrial hygiene are aware that M.A.C. values for different substances have different origins and represent different degrees of hazard. Because of this, there has been a search for many years for a better expression than "maximum allowable concentration." "Threshold limit value" is one such term. It implies something possibly less legalistic since more than one type of threshold might be indicated whereas "allowable" presents an inflexible aspect. "Hygienic standards" is another proposed term. None of the proposed expressions has won complete accept-

ance, and, consequently, "M.A.C." is still heard wherever industrial hygienists gather, possibly because of our fondness for initials. A recent movement has considerable backing to use the same initials but to substitute "acceptable" for "allowable."

"Maximum acceptable concentration" would seem to have a good chance for widespread use because it indicates a standard in which the degree of hazard has been given some considera-

Encyclopedia of Industrial Hygiene Instruments

The University of Michigan Institute of Industrial Health and School of Public Health and the Public Health Service Occupational Health Program, Cincinnati, cooperated in the preparation of the Encyclopedia of Instrumentation for Industrial Hygiene. Technical editors are Charles D. Yaffe, Dohrman H. Byers, and Andrew D. Hosey of the Public Health Service.

The 1,243-page volume contains comprehensive information on the approximately 1,000 air-sampling instruments exhibited at the Symposium on Instrumentation for Industrial Hygiene, held at the university, May 24-27, 1954. It also contains 28 technical papers presented at the symposium.

Described are instruments for measuring air velocity and metering air, laboratory-type instruments of specific application to industrial hygiene, instruments specifically designed for atmospheric pollution evaluation and meteorological measurements, instruments for sampling and analyzing air for contaminants in industrial environments, and instruments for measuring sound and vibration, for measuring ionizing radiation, and for measuring ultraviolet, visible, and infrared energy.

Included for each instrument are a physical description, data on performance, and information on uses, operating principle, source, and price. In addition, there are photographs, wiring and schematic diagrams, and operating, calibrating, and maintenance instructions.

The encyclopedia was published by the university in April 1956 and may be ordered from the Publications Distribution Service, University of Michigan, Ann Arbor, Mich.

tion. If so, it might be well to point out that future use of M.A.C. will need to be accompanied with a definition of the intended meaning.

In conclusion I refer those interested to the following discussion of this point taken from "A Guide to Uniform Industrial Hygiene Codes or Regulations," which was issued a few years ago by the American Conference of Governmental Industrial Hygienists.

"Maximum concentrations shall not be used as the sole criterion for establishing evidence of hazard to health or well-being, but the evaluation of a possible hazard shall also be subject to other pertinent factors such as the nature of the contaminant and the frequency and duration of the exposure or clinical evidence of harmful effects.

"Thousands of elements, compounds, and mixtures are employed or encountered in places of employment, and the number of new ones being utilized is constantly increasing. Some of these have been found to injure health if present in the working atmosphere in excessive concentrations. Others, while not producing demonstrable injury, have been found to cause irritation, coughing, sneezing, objectionable breath, or other undesirable results.

"Through actual experience in industry, a great deal has been learned about the effects of some substances. This information has been supplemented by considerable laboratory research. The body of

knowledge regarding toxicity of substances is fairly large and is steadily increasing in size. Much more remains to be learned, however, not only about the newer materials but also about some which have been studied for many years. Honest differences of opinion as to the safe concentrations of some of the more common toxic materials exist among authorities in the field of industrial toxicology. Greater differences of opinion are naturally encountered with respect to the limits to recommend for substances on which there is more limited experience.

"Despite the gaps in our present state of knowledge, specific figures must of necessity be provided at least as a guide toward the definition of what constitutes a safe working atmosphere. Specific figures are desirable not only for the use of the authority in determining essential compliance with codal provisions but also are helpful to industry as benchmarks upon which it can base a design of control equipment which it plans to install. There are some who feel that specific figures should not be included unless there is a great deal of conclusive evidence to justify the figure established. However, if no figure is given for a substance because of the absence of positive proof, when question arises as to the presence of a suspected hazard, the authority must render a decision regardless of whether or not a specific value is contained in the code. Consequently, it is felt advantageous to make the list in the code as inclusive as is possible."

PHS Announcement

Dr. Theodore J. Bauer, formerly chief of the Public Health Service Communicable Disease Center in Atlanta, has been named deputy chief of the Bureau of States Services. He succeeds Dr. Leroy E. Burney, recently appointed Surgeon General of the Service.

With the Public Health Service since 1934, Dr. Bauer has served as venereal disease control officer for the Chicago Board of Health during 1942-48, and as chief of the Venereal Disease Division during 1948-53, when he was appointed to the Communicable Disease Center post.

He is a graduate of the University of Iowa liberal arts and medical schools.

Hospital and Medical Facilities Survey And Construction Program

By JOHN W. CRONIN, M.D.

THE Hospital Survey and Construction (Hill-Burton) Program was instituted in August 1946. Its purpose is to make available adequate hospital, clinic, and similar services to all the people through a program of grants to States for survey and planning; and grants on a matching basis to assist in the construction of public and voluntary nonprofit hospitals, public health centers, and related facilities.

The facility must fill a community need and may be new construction or the remodeling or enlarging of existing facilities. The project sponsor must initiate the project and is responsible for its operation. The Federal Government provides financial assistance, sets minimum standards of construction, and, by law, is restricted from the selection of personnel in the operations or in the administration of the completed facility. All projects must be non-profit or public in type which render a community service, and, in general, do not discriminate on basis of race, creed, or color.

The Medical Facilities Survey and Construction Amendments of 1954 authorized categorical funds for hospitals for the chronically ill and impaired; nursing homes; diagnostic centers or diagnostic and treatment centers; and, rehabilitation facilities.

Federal funds were appropriated to match State funds to survey the need for hospitals and

Dr. Cronin is chief of the Division of Hospital and Medical Facilities, Public Health Service. This is a summary report based on a paper presented at the meeting of the section on preventive and industrial medicine and public health, American Medical Association, on June 14, 1956, at Chicago, Ill.

medical facilities prior to the utilization of the construction funds within the respective States.

As of May 1, 1956, the total estimated cost of all facilities approved amounted to \$2,284 million. The Federal contribution represents \$740 million and is matched by sponsors' funds amounting to \$1,544 million.

There have been 2,905 projects approved. Of these, 2,035 providing 94,566 beds have been completed and are in operation; 553 projects adding 24,915 beds are under construction; and 317 projects adding 11,580 beds are in the pre-construction stage. A grand total of 131,061 hospital beds, 619 public health centers and many adjunct facilities are provided.

The majority of all approved applications are for general hospitals—73 percent and 94,928 beds. Three percent are for mental hospitals—13,047 beds. Two percent are for tuberculosis hospitals—8,478 beds. Two percent are for chronic disease facilities—7,484 beds. Nineteen percent are for public health centers and one percent for other related health facilities.

Twenty percent of the total funds went to teaching institutions, including 37 university medical school hospital projects. Of the 1,057 new hospitals about 55 percent are located in towns under 5,000 population while only 11 percent are in cities of 50,000 or more people. The civil defense implications are obvious. Five hundred and thirty-five new general hospitals are located in areas which had no hospitals prior to the beginning of the program.

The total annual authorization of this program is \$210 million.

The estimated bed deficit in the United States and Territories as reflected by the official State Plans is 850,000 beds. Progress in alleviating this shortage is slow because of annual population increase and the physical and functional obsolescence of the Nation's existing hospital resources.

In 1955, \$1,200,000 of Federal funds were appropriated for research in hospital services, facilities, and resources by the Public Health Service and through grants for research and demonstration purposes. All of these funds have been awarded to qualified applicants. A total of 27 grants have been made.

Food Poisoning



caused by

the

GREAT BARRACUDA

By SIDNEY PAETRO, M.P.H.

DURING the spring and summer of 1954, four incidents of illness following the consumption of fish were reported to the Broward County Health Department in Fort Lauderdale, Fla. The clinical manifestations of the illness and the results of laboratory and epidemiological investigations indicated that it was fish flesh poisoning, or ichthyosarcotoxism, resulting from ingestion of the great barracuda, *Syphraena barracuda*.

May 13. The first incident was reported on May 13 by a local physician. Five persons had eaten dinner at approximately 6 p. m. the day

before at a rooming house in Fort Lauderdale. The meal consisted of barracuda, succotash, eggplant, cole slaw, okra, mashed potatoes, banana pudding, hot rolls, coffee, and iced tea. All five persons became ill within 1 to 2 hours after they had eaten. Symptoms and complaints were nausea, diarrhea, metallic taste, and the unusual reactions of cold objects feeling hot and hot objects feeling cold, numbness of the arms and legs, and itchiness. Three pet cats fed only barracuda died within 24 hours.

The barracuda, estimated to weigh $6\frac{1}{2}$ pounds, was caught in the Atlantic Ocean about $1\frac{1}{2}$ miles off the coast of Fort Lauderdale near the 2-mile reef about 4 p. m. on May 11. It was placed in deep freeze soon after it was caught and kept there until the following evening, when it was prepared and then fried in a commercial shortening. One of the victims commented, "The fish was the prettiest, whitest, best tasting fish I ever ate."

Mr. Paetro is sanitarian for the South Broward District, Broward County Health Department, Fort Lauderdale, Fla. Investigation of the fish poisoning incidents was conducted by Richard L. Almeida, chief sanitarian of the department, and the author.

Three of the victims were hospitalized immediately. One was ill for 2 weeks, two for about a month, another for 6 weeks, the fifth remained in bed for 5 weeks and had after-effects of the illness when interviewed almost 4 months later.

Specimens of both the raw and the cooked fish were sent to the laboratory of the Florida State Board of Health on May 13. The laboratory reported that "no organisms commonly associated with food poisoning were isolated."

June 27. Of 10 persons who ate barracuda for dinner at a restaurant in the city of Pompano, 7 became ill in varying degrees. The victim interviewed stated that the onset of illness occurred approximately 4 hours after she had eaten and that she was hospitalized for 3 days. Symptoms included gastrointestinal disturbances similar to those reported in the first incident, temporary loss of speech, and partial loss of touch in the extremities.

In addition to barracuda, the meal consisted of cole slaw, green peas, french fried potatoes, pickled watermelon rinds, bread, butter, and beer. Three barracuda were eaten, all 3 weighing an estimated 15 pounds. They had been caught about 2 miles off Hillsborough Inlet, north of Pompano Beach. The fish were cleaned, brought to the restaurant, broiled, and served the same day caught. No specimens were available for laboratory analysis.

July 9. Between 6 and 7 p. m. a family of eight members ate a meal consisting of barracuda, cornmeal cakes, fried onions, corn on the cob, tossed green salad, cherry pie, and the usual drinks. All 8 became ill, and 5 were hospitalized. The illness occurred from 1 to 5 hours after the meal. A small amount of the fish was given to a neighbor, and a similar quantity was fed a pet dog during the meal. Both the neighbor and the dog became ill. The symptoms in all persons were similar to those previously reported.

The barracuda was caught off the Fort Lauderdale coast near the third buoy at approximately 7:30 a. m. There was no refrigeration aboard the vessel, but soon after the boat docked at 9:30 a. m., the fish was placed on ice. It was prepared and deep fried in fresh commercial shortening the same evening. Comments concerning the fish included, "Nothing unusual"

and "It looked beautiful and tasted delicious." A specimen of the fish which had been kept in deep freeze was sent to Dr. Bruce W. Halstead at the School of Tropical and Preventive Medicine, College of Medical Evangelists, Loma Linda, Calif. Dr. Halstead reported that tests on mice with this sample were "mildly symptomatic."

August 24. At approximately 6 p. m., a man, his wife, and their 4-year-old daughter consumed a meal of barracuda, tartar sauce, asparagus (frozen), salad, cookies, ice cream, and iced tea. The parents became ill in approximately 7 hours; the child, within 10 hours. They reported symptoms similar to those already described plus general weakness and a spicy taste to unspiced foods. The illness lasted 5 to 6 days.

The barracuda was caught, 7 weeks earlier, near the 3-mile reef off the Pompano and Boca Raton coast. It was estimated to weigh 15 pounds. On the day it was caught, a section had been given to a neighbor and the remainder placed in deep freeze. Discussing the illness with the neighbor, we learned that the neighbor and his wife had eaten the fish the day it was given to them and that they had both become ill. They were ill for 3 days.

One specimen of the frozen fish was submitted to the Florida State Board of Health laboratory, and another specimen was sent to Dr. Halstead. The State laboratory reported: "Organisms isolated culturally characteristic of the coliform group." Dr. Halstead reported that tests on mice with this sample "produced very severe symptoms in 1 mouse and 1 mouse died 27 hours after injection, which, according to our routine classification, would indicate that the barracuda sample was moderately toxic."

Health Department Action

It was not possible to obtain a list of foods each individual ate at each of the meals in question. However, a study of the lists of all foods prepared and served at each meal revealed that only one food, barracuda, was common to all.

The health department gave two news releases to the local newspapers during these

months. The first, on July 21, reported the occurrences of food poisoning recorded to that date and requested that the health department be notified should illness follow consumption of fish, particularly barracuda. The second, dated September 1, described the latest incident and urged that all instances of food poisoning be reported and that samples of suspected foods be preserved on ice for laboratory analysis. No reports were received after that of the August 24 episode.

During the course of the investigation, we gathered and studied numerous publications, research papers, and opinions in an effort to determine the cause of an illness the characteristics of which had never before been reported in this area. Presented below is some of the more pertinent information compiled from these sources.

Characteristics of Fish Poisoning

Ichthyosarcotoxicosis is the technical term for intoxication resulting from the ingestion of the flesh of poisonous fish.

One of the first symptoms to develop is a tingling about the lips and tongue. The tingling soon spreads to the hands and feet and gradually develops into numbness. These symptoms may appear at any time within a period of 30 hours after ingestion of the fish. Gastrointestinal symptoms are said to be reported by about 75 percent of the victims (1). Some persons state that their hands and feet are without feeling, whereas others report that their hands and feet hurt when placed in water. Persons with very severe cases generally suffer impairment of movement and sometimes they are unable to walk or stand (2).

One of the most outstanding symptoms is the generalized sensory disturbance in which temperature sensations are reversed; that is, hot objects seem cold to the touch, and cold objects seem hot. This particular disturbance has been reported from many widely scattered areas of the world for more than 175 years.

Recovery from severe attacks of fish poisoning is usually very gradual. Symptoms of weakness sometimes persist for months after specific symptoms have disappeared. An at-

tack does not impart immunity, and there is no known specific antidote or antitoxin (1).

Clinical reports indicate that the ichthyosarcotoxins from many fish species are powerful neurotoxins. The symptoms are similar to those produced by such compounds as aconitine, muscarine, and curare (3).

There are four major types of ichthyosarcotoxicosis: ciguatera; Tetraodon, or puffer, poisoning; scombroid poisoning; and *Gymnothorax* poisoning. All of these have many characteristics in common, but they differ as to the predominance of certain types of symptoms. Ciguatera is the type thought to have caused the incidents reported to the Broward County Health Department.

Ciguatera, or Caribbean type fish poisoning, has been known for a number of centuries in the countries bordering the subtropical and tropical waters of the Caribbean Sea, the Atlantic Ocean, and the Pacific Ocean. Although numerous species of fish produce this type of poisoning, one of the common causative species is the *Sphyraena barracuda*.

Ciguatera is considered the least virulent form of fish poisoning. The mortality rate has been estimated to be 2 or 3 percent. Complete recovery from the weakness and myalgia can be a matter of weeks or months (3). Records indicate that not all persons who eat poisonous fish become ill, but one attack of ciguatera does not impart immunity to subsequent attacks.

Besides the usual symptoms of fish poisoning, ciguatera has these characteristics:

1. The onset occurs from 1 to 10 hours after ingestion of the fish.
2. There is a distinct metallic taste in the mouth.
3. There is a tingling sensation and itchiness which may last for days (4).
4. Malaise, chills, fever, prostration, profuse sweating, generalized motor incoordination, muscular weakness, and joint aches are common (3).
5. Cramps may occur in the extremities (4).

Theories Regarding the Cause

Many theories regarding the cause of fish poisoning have evolved over the centuries. Following are some of these theories and the opin-

ions of scientists who have done research in this field.

Food-Chain Theory

According to the food-chain theory of fish poisoning, the flesh of fish is made toxic by the consumption of poisonous plants or animals, such as manchineel berries, certain algae, dinoflagellates and other marine invertebrates, jellyfish, corals, swarming palolo worms, mollusks, and crabs.

Halstead and Bunker state that if this theory is correct, the distribution of the toxin within the fish is probably governed by three principal factors: venous draining of the intestine, detoxication, and metabolic processes of the fish (5). Therefore, a high concentration of the "toxin" should be found in the liver and intestine and a low concentration in the somatic muscle if the fish is captured soon after feeding, and the reverse situation if the fish is caught at a later time.

Hiyama tested organ and muscle tissue of poisonous fish in feeding experiments (2). He did not find that the poison was limited to any particular organ, but he did find that muscle tissue produced the most obvious indication of poisoning. On examination of the stomach contents of poisonous fish, he found neither seaweed nor fragments of echinoderms, but unidentifiable digested remains of small fish. Examination of fish collected in areas inhabited by poisonous crabs showed that most of the fish had been feeding on small siganids; no crab fragments were found. In his opinion, there was no connection between feeding habits and toxicity of the fish.

Poisonous fish have been found at all depths of the ocean; therefore, nothing valid can be deduced from their living habits.

Copper-Contaminated Waters

The theory that fish may become poisonous from underwater deposits of copper, copper-lined bottoms of sunken vessels, or war materials containing copper has received some attention. The copper compounds, according to this theory, are absorbed by the fish and become a part of its body composition, making the fish toxic.

Arcisz considered this theory improbable

since all fish caught near copper banks are not toxic, and, conversely, toxic fish are found where there are no known copper banks (4). The same logic can be applied to sunken vessels or war materials found on the ocean bottom.

Size, Sex, and Development

Many investigators consider the size of the fish an important factor in fish poisoning. They regard large fish as generally more toxic than small ones of the same species. A few authorities believe that small fish are never toxic (4). However, little dependable information is available in this regard.

Hiyama was unable to detect any variation in toxicity with sex of the fish, but he observed a variation in toxicity with age in a number of different species (2). Phillips and Brady believe that sexual maturity is not necessarily a factor in toxicity (6).

Bacterial Contamination

Another theory holds that the toxin is produced as a result of bacterial contamination. The contamination may be on or in the fish before it is caught, or it may be introduced during handling or processing after it is caught.

In studying ichthyosarcotoxicosis, Halstead and Lively found that the freshness of fish had no relation to virulence of the toxin (3). Cohen and his colleagues (7) and Yasukawa (8) do not believe that the toxic agent is of bacterial origin.

Endogenous Theory

Yasukawa found that the location of the poison varied with different species of fish (8). It is found chiefly in the gonads, particularly in the ovaries, and sometimes in the liver. In his opinion the toxin is not produced until the fish reaches maturity and is most virulent in its action during the spawning season.

Tani found that the toxicity of the puffer was highest during the spawning season of the year (9). The toxicity reached a peak a short time before the spawning season, continued at the same level for a few weeks after spawning, and then gradually declined.

It is known that the reproductive organs and roe of certain fish may be poisonous, but

Phillips and Brady are of the opinion that these cannot contaminate the flesh of the fish directly (6).

An Unexplained Phenomenon

None of these theories would seem to explain why the consumption of barracuda caught off this part of the east coast of Florida in the spring and summer of 1954 resulted in illness. Hundreds of the same species of fish were caught in the same waters during the same period and were eaten without harmful effects. Barracuda from these waters have been eaten in the years before and since; yet no other illnesses of a similar nature are on record.

On the basis of the food-chain theory of fish poisoning, the possibility that the incidents were associated with the phenomenon known as red tide was considered early in the investigation. It was dismissed, however, when we learned that the dinoflagellate responsible for red tide, *Gymnodinium brevis*, has never been observed along the eastern coast of Florida, although it is found periodically along the Gulf Coast.

It is earnestly hoped that research on fish flesh poisoning will be intensified so that outbreaks such as those described here can be prevented. Basic knowledge is needed regarding the factors that cause the flesh of sometimes edible fish to become poisonous, the chemical and pharmacological properties of the toxins, and

means by which poisonous fish can be recognized.

REFERENCES

- (1) Halstead, B. W.: Ichthyotoxism—A neglected medical problem. *M. Arts & Sc.* 5: 115-121, Fourth Quarter, 1951.
- (2) Hiyama, Y.: Poisonous fishes of the South Seas. U. S. Fish and Wildlife Service Special Scientific Report: Fisheries No. 25. Washington, D. C., U. S. Government Printing Office, 1950, pp. 1-85.
- (3) Halstead, B. W., and Lively, W. M., Jr.: Poisonous fishes and ichthiosarcotoxism. *U. S. Armed Forces M. J.* 5: 157-175, February 1954.
- (4) Arcisz, W.: Ciguatera: Tropical fish poisoning. U. S. Fish and Wildlife Service Special Scientific Report: Fisheries No. 27. Washington, D. C., U. S. Government Printing Office, 1950, pp. 1-23.
- (5) Halstead, B. W., and Bunker, N. C.: A survey of the poisonous fishes of the Phoenix Islands. *Copeia*: February 1954, pp. 1-11.
- (6) Phillips, C., and Brady, W. H.: Sea pests—Poisonous or harmful sea life of Florida and the West Indies. Coral Gables, Fla., University of Miami Press, 1953, 78 pp.
- (7) Cohen, S. C., Emert, J. T., and Goss, C. C.: Poisoning by barracuda-like fish in the Marianas. *U. S. Naval M. Bull.* 46: 311-317, February 1946.
- (8) Yasukawa, T.: Poisonous fishes of the South Seas. U. S. Fish and Wildlife Service Special Scientific Report: Fisheries No. 25. Washington, D. C., U. S. Government Printing Office, 1950, pp. 189-196.
- (9) Tani, I.: Toxicological studies on Japanese puffers. Tokyo, Japan, Imperial Chemical Corp., 1945, vol. 2, No. 3, pp. 1-103.



Infectious Hepatitis, Diarrhea, and Typhoid Fever

By GILBERT V. LEVIN, M.S., and HOWARD WEST, M.P.H.

A NUMBER of cases of infectious hepatitis, diarrhea, and typhoid fever occurred during the period August 1954 to April 1955 within a six-block radius in Washington, D. C. Circumstances surrounding the earliest known cases indicated that the diseases might be linked to a common source, a contaminated water supply. Consequently, a three-disease epidemiological study of the approximately 7,000 persons in the area was undertaken by the District of Columbia Department of Public Health.

The incident that first attracted the attention of the investigators to this unusual chain of events took place during the week of January 3, 1955. Seven cases of diarrhea occurred among members of four households occupying a building in the 400 block of Sixth St., SW. The only person in the building who did not have the disease was a 6-month-old infant for whom all water had been boiled. The exist-

ence of yard hydrants and yard water closets in this neighborhood heightened suspicion that the water supply had been contaminated. These obsolete plumbing fixtures cross-connect the water supply with the sewer line so that fresh water standing in the riser pipes can drain into the sewer to prevent freezing in the pipes during the winter. Experience in the District of Columbia and elsewhere (1, 2) has shown that under certain conditions sewage can enter the water supply through the cross connections.

Beginning on January 13, the date the outbreak was reported to the health department, a week-long series of 26 water samples was taken from the area. Two of these samples, one from the building where the outbreak took place and one from an adjacent building, were positive for coliform organisms. Free available chlorine of 0.2 p.p.m. or more was present in all the 26 samples except 3 which came from the buildings producing the coliform-positive samples. The chlorine demand thus demonstrated in this restricted area was further evidence of local contamination of the water supply.

A detailed plumbing survey revealed the presence of numerous yard hydrants and yard water closets in the neighborhood. Many of them were defective. Since the four households had no social contact, were served by different dairies, and had individual kitchen facilities, the circumstantial evidence indicated that the outbreak was waterborne.

During the week of January 25, a case of infectious hepatitis occurred just four doors away from the scene of the diarrhea outbreak. This

Mr. Levin, now civil defense representative for the District of Columbia Department of Public Health, was public health engineer with the department's bureau of public health engineering when the study reported here was conducted. Mr. West has been chief of the biostatistics and health education division of that department since February 1954. He was formerly chief of the Statistical Processing Branch, National Office of Vital Statistics, Public Health Service.

Dr. Ralph Paffenbarger, epidemiologist with the Public Health Service, provided technical guidance in making the study and in preparing the report.

aroused the suspicion that there might be a connection between the two incidents. Infectious hepatitis has been known to be water-borne (3-10).

The infectious hepatitis patient was a school child. Inquiry at the school revealed three other cases, and a check with 13 other schools in Southwest and Southeast Washington, four more cases. A sanitary survey of the two schools involved disclosed nothing to indicate that the disease was being spread by conditions at the schools.

The 8 infectious hepatitis patients and the 7 diarrhea patients all lived within a radius of 6 blocks in Southwest Washington. Also within this area were located three cases of typhoid fever which had occurred in the fall of 1954.

Case-Finding Survey

To determine if an epidemic of one or more of the three diseases was in progress, the health department conducted a case-finding survey March 2-16, 1955. Interest now centered about infectious hepatitis, which is not a reportable disease in the District of Columbia. As the normal incubation period of infectious hepatitis ranges from 15 to 35 days, it was decided to request information back to Thanksgiving Day, November 25, 1954, approximately one maximum incubation period before the date of onset of the earliest known case and a convenient mental landmark.

The area selected for the survey, shown in figure 1, was the smallest considered likely to yield conclusive results. Its 27 city blocks encompassed the locations of the known cases of the three diseases.

Interviews were held with members of 1,579 households out of the 1,955 households in the area, yielding information on 5,519, or 81 percent, of the estimated 6,800 persons living in the area.

Ratios of yard hydrants and yard water closets to the population were determined for possible correlation with attack rates of the three diseases. Information on yellow eyes or skin, white or gray stools, and abdominal tenderness was requested from the interviewees. Positive information regarding the first or second item, together with an associated illness of plausible

duration, was considered a probable case of infectious hepatitis. Only cases diagnosed and verified by physicians were classed as definite cases of infectious hepatitis.

The portion of the city in which the survey

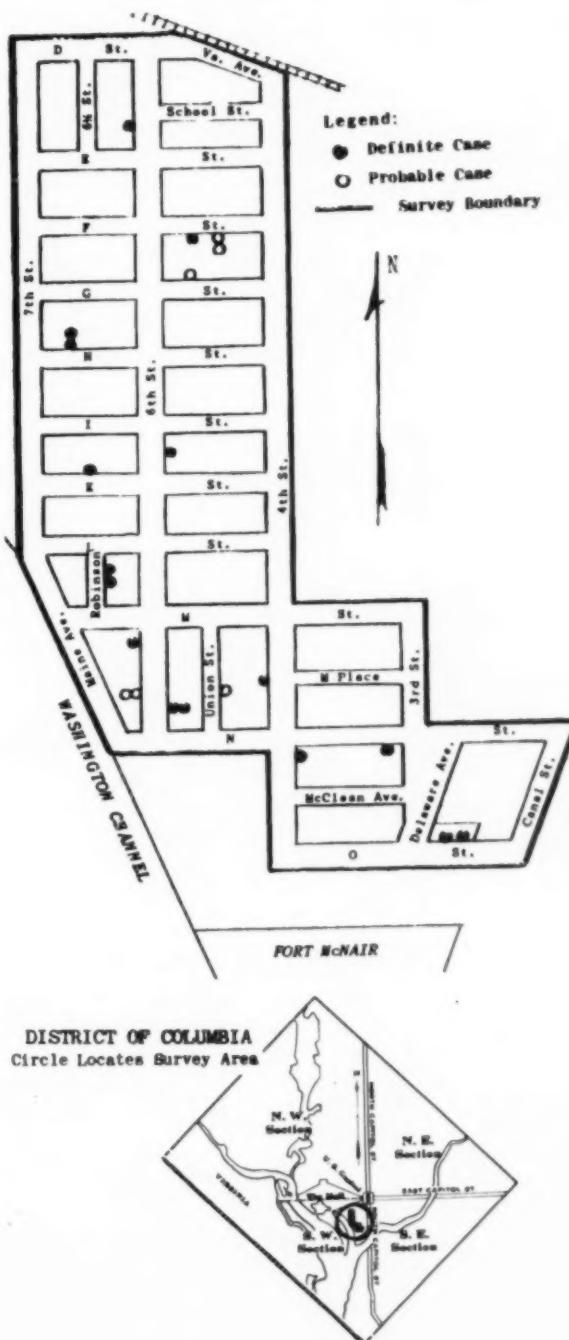


Figure 1. Distribution of infectious hepatitis cases within survey area, Washington, D. C., November 25, 1954-March 10, 1955

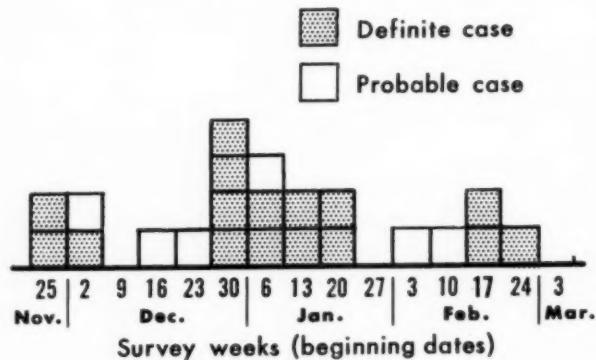
area is located is of low socioeconomic status and is characterized as "blighted" to "slum." Most of the buildings are old, two-story, brick, row houses that have been converted into tenements. There are small stores and shops on some of the streets, but no large industrial plants. The area is primarily residential and is inhabited by both the Negro and white races, with Negroes predominating.

The survey area had a population density of approximately 43,200 persons per square mile. Age, race, and sex distributions of the surveyed population are given in table 1. Of the 1,579 households, 27.4 percent had outdoor plumbing fixtures. The households served by outdoor plumbing comprised 1,608 persons, 29.2 percent of the surveyed population.

Infectious Hepatitis

Sixteen definite and six probable cases of infectious hepatitis occurred in the survey area between November 25 and March 10. There was no correlation between incidence and outdoor plumbing. On the contrary, there was strong evidence that the outbreak was propagated by contact. This was demonstrated by a comparison of two ratios: (a) the number of infected persons reporting contact to the total number of infected persons and, (b) the number of noninfected persons reporting contact to the total number of noninfected persons. These ratios expressed as percentages proved to be

Figure 2. Incidence of infectious hepatitis in survey area, Washington, D. C., November 25, 1954–March 10, 1955



23.9 and 0.1, respectively; thus, the rate of contact was 239 times as great for those who had the disease as for those who did not.

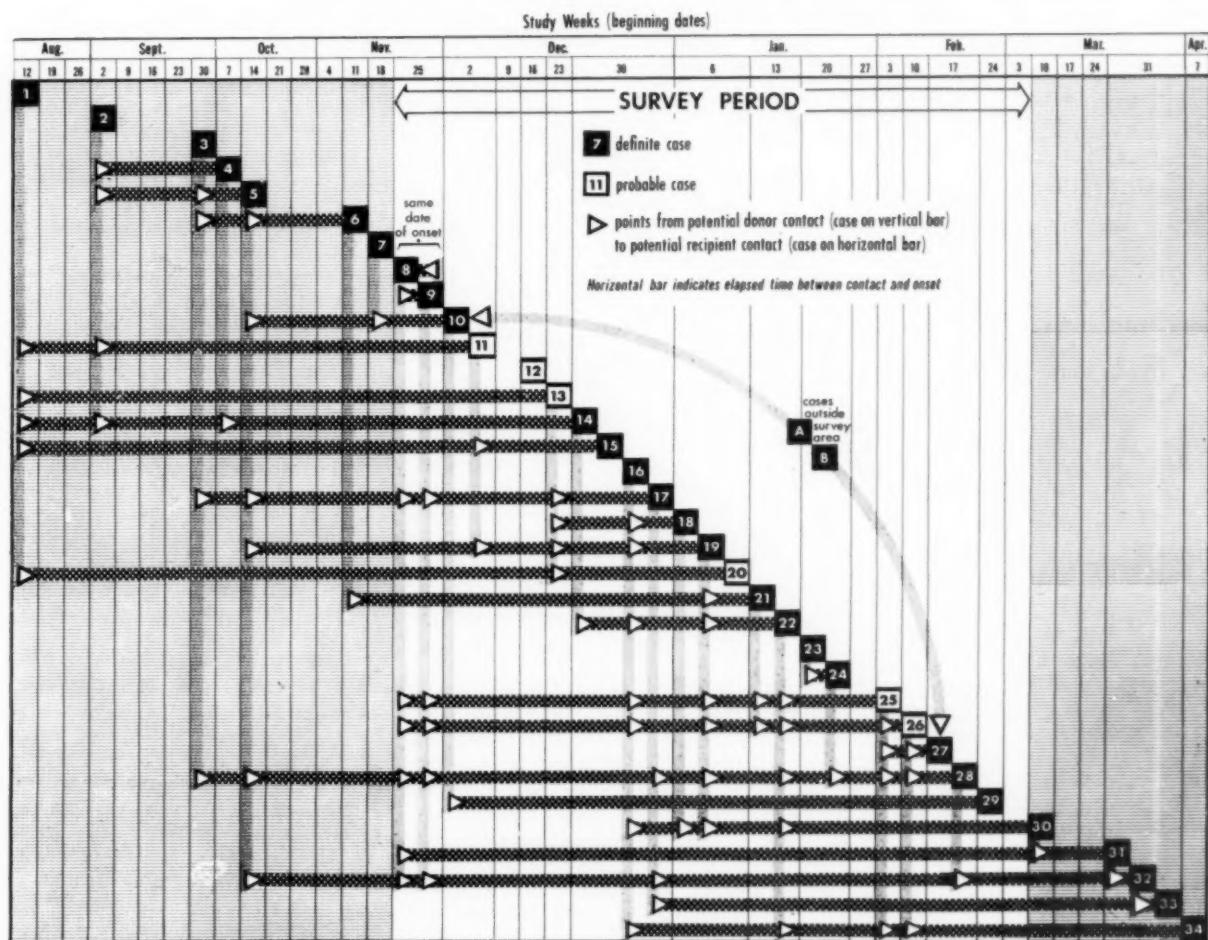
The distribution of the cases by date of onset is given in figure 2. It is typical for contact spread. Distribution of the cases by location is shown in figure 1.

The most striking fact about the outbreak is that it was almost completely confined to white children under 15 years of age. Fourteen of the 16 definite cases and 2 of the 6 probable cases occurred among that group. The number of white children under 15 years of age in the survey area was 620. Thus, the attack rates for that group for the survey period were 2,260 per 100,000 for definite cases and 2,900 for definite plus probable cases.

Table 1. Age, race, and sex distribution of the surveyed population

Age (in years)	Total	White				Negro				Race not stated			
		Total	Male	Female	Sex not stated	Total	Male	Female	Sex not stated	Total	Male	Female	Sex not stated
Total	5,519	2,047	995	1,039	13	3,216	1,433	1,779	4	256	130	125	1
Under 5	719	208	105	102	1	476	238	238	0	35	16	19	0
5-9	710	242	111	131	0	440	214	226	0	28	15	13	0
10-14	489	170	93	77	0	303	134	169	0	16	10	6	0
15-24	656	233	97	136	0	398	152	246	0	25	13	12	0
25-34	657	245	126	119	0	375	145	230	0	37	18	19	0
35-44	758	284	135	149	0	441	181	260	0	33	14	19	0
45-54	595	224	116	108	0	336	151	185	0	35	20	15	0
55-64	414	184	94	90	0	213	110	103	0	17	9	8	0
65 and over	329	168	82	86	0	147	69	78	0	14	6	8	0
Not stated	192	89	36	41	12	87	39	44	4	16	9	6	1

Figure 3. Chain of "potential contacts" for the 34 cases of infectious hepatitis cases occurring in the survey area, August 12, 1954—April 14, 1955



The crude attack rate for definite cases was 290 per 100,000 population for the 15-week period; it was 400 for definite plus probable cases. Annual attack rates for reported infectious hepatitis cases in 14 major cities in the United States in 1954 ranged from 5.4 to 141.0 per 100,000 population. Of course, attack rates based on reported cases cannot be compared with rates based on an intensive survey. They are included only to indicate the general level of incidence of the disease.

Four secondary cases occurred during the survey period, 2 definite and 2 probable cases. Eighty-two persons were risks to secondary infections (members of a household in which a primary case occurred) for definite cases, and 105, for definite or probable cases. Thus, the secondary attack rates for the survey period

were 24.4 per 1,000 for definite cases and 38.1 per 1,000 for definite plus probable cases. The ratios of secondary to primary attack rates were 9.6 and 11.7 for definite and definite plus probable cases, respectively. Three of the four secondary cases occurred within 2 weeks of the primary cases. The fourth occurred 12 weeks after its primary case.

In light of the findings of the case-finding survey, the health department made a case-and-contact survey shortly thereafter. An additional 12 definite cases were discovered to have occurred within the bounds of the survey area from August 12 through April 14, giving totals of 28 definite cases and 34 definite plus probable cases for this period. No rates, of course, can be inferred from these numbers since it is unlikely that they include all cases occurring be-

Table 2. Chronology of infectious hepatitis cases by communal place, September 2, 1954—April 6, 1955

Communal place	Week number												Survey period												28	29	30	31					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27						
School A	2						4											{14}	{15}														
School B							5										8																
School C																		13	17														
Club A																		13															
School D																		16	{18 19}	22													
Club B																		23	{24}	25	26	27	28									30	

¹ Probable case.

fore or after the survey period. The earliest known case associated with the outbreak was that of a woman who worked in a grocery store in the area. While in the store, she had contact with many of the children in the neighborhood; in her case history, she cited four who later became ill.

Analysis of the contact information showed a surprisingly complete chain of "potential contacts" within the limited survey area. A person was considered to be a potential contact if he was named as a contact by a person who had a definite or probable case of infectious hepatitis and if he too was found to have had a definite or probable case. To elicit the maximum contact information from the interviewees, questions were asked regarding persons in the following categories: acquaintances who had had infectious hepatitis since September 6; other patients and their contacts known personally by the interviewee (usually schoolmates); visitors to the patient during his illness; persons associated with the patient in the home environment within 3 days before or 3 days after date of onset. The potential contact chain for the 34 definite and probable cases is shown in figure 3.

For 27 of the 34 cases, the contact information revealed one or more possible sources of infection among members of the group. Only two of the potential donors of the disease lived out-

side the survey area. These facts are a strong indication that the outbreak was confined largely to the survey area. A check with the schools attended by the infectious hepatitis patients, which also draw students from outside the survey area, supported this contention. As shown in figure 1, the survey area has several isolating boundaries: the railroad on the north, the Washington Channel on a portion of the western border, and a military reservation just beyond the southern limit. Several blocks to the east, the buildings had been torn down in a slum clearance project.

When the applicable cases were grouped chronologically by communal places (schools or clubs of which two or more members had the disease), table 2 resulted. These data show that the disease progressed in a fashion typical of contact. Twenty-three of the thirty-four patients were members of six such groups. Intracommunal group contact can be traced by referring to figure 3.

According to available figures, 9.0 to 9.9 percent of all dwelling units in an area similar to, and including, the survey area provide less than 39 square feet of sleeping space per person. For the 30 households in which infectious hepatitis occurred, the percentage was 16.6. For the 6 households in which secondary cases occurred, the figure was 50 percent. (Two secondary cases occurred prior to the period covered by the original survey.) This indicates, as

might be expected, a correlation between incidence of secondary cases and crowding.

All the cases among school children occurred in the white population although the schools are not segregated. Only two definite cases and one probable case, all in persons over 27 years of age, occurred among the large Negro population of the area. These facts arrest attention, but there are two possible explanations. First, classroom contact may not be close enough for spread of the disease, which may take place in more intimate, and still generally segregated, extracurricular activity groups. Second, jaundice is more difficult to recognize and to diagnose in Negroes than in whites. The possibility that the diagnosis and treatment facilities available to the two groups were unequal is not supported by records for the medically indigent of the area.

Diarrhea

Fifty-eight persons had diarrhea during the 15-week survey period, November 25 to March 10, a crude attack rate of 1,050 per 100,000 population. None of these persons knowingly had either infectious hepatitis or typhoid fever during that period. With the exception of the initial outbreak of 7 cases, none of the cases were attributable to outdoor plumbing. On the basis of appropriate population adjustment, diarrhea attacked four times as many whites as Negroes. No explanation for this has been evolved.

The secondary attack rate for diarrhea was 134 per 1,000 exposed persons in the surveyed population. The ratio of the secondary attack rate to the primary attack rate was 15.7, indicating that intrafamilial contact was a potent factor in the spread of this disease.

Typhoid Fever

No cases of typhoid fever occurred during the period covered by the survey. However, the surprisingly large number of 74 persons reported that they had had typhoid fever at some time in the past. Of these, 40.3 percent were served by outdoor plumbing at the time of the survey, as compared with 29.2 percent for the total population. Since many of the 74 had typhoid fever in other homes or even in other

cities, these figures do not indict the plumbing as the source of their disease, but they are of epidemiological significance from the standpoint of typhoid fever carriers.

A check of all available typhoid fever registers in the department of public health yielded records on only 5 of the 74 persons. They were listed as noncarriers. But what about the remaining 69, many of whom live in homes with outdoor plumbing? Furthermore, the finding of these 74 persons, coupled with a knowledge of plumbing conditions in similar areas, implies that there are a large number of persons in the city who have had typhoid fever and who are currently living in dwellings served by outdoor plumbing. That carriers among them pose a real threat is suggested by the fact that during the past 10 years an annual average of 14 cases of typhoid fever has been reported in the District of Columbia.

A 7-year-old girl and 5- and 7-year-old sisters living a block away from her made up the group of three typhoid fever cases reported in the fall of 1954. None had drunk any water other than from the municipal supply within 30 days prior to onset of the disease. The first girl became ill on September 29. She gave a history of contact with the two sisters within 3 days of that date. The other 7-year-old girl became ill on October 8, and her sister, on November 21.

The mother and a relative of the first of the girls had typhoid fever several years ago. Stool specimens from both had been examined in October 1954 and found to be negative for organisms of the *Salmonella* or *Shigella* groups. A test of a specimen from the relative in August 1955 was also negative.

Both households in which the three typhoid fever cases occurred have outside plumbing, and general household sanitation is very poor.

Summary

Circumstantial evidence suggested that contamination of the water supply through outdoor plumbing was responsible for the spread of infectious hepatitis, diarrhea, and typhoid fever in a small area of Washington, D. C., in late 1954 and early 1955. Investigation showed that, although one outbreak of diarrhea was

probably waterborne, contact was the major factor in most cases of the three diseases.

The infectious hepatitis was confined almost entirely to white children under the age of 15 years. The rate of personal contact with prior cases was significantly higher for persons who had the disease than for those who did not. A nearly complete chain of contact among the patients was traced within the survey area.

Data on sleeping space per person indicated a relation between the incidence of secondary cases of infectious hepatitis and crowding.

An unexpectedly large number of persons who had once had typhoid fever were found in the survey area. Poor sanitary and plumbing conditions, as well as contact, were associated with three cases of typhoid fever reported in the fall of 1954.

* * *

Details of the study plan and procedures and the forms used in the surveys are available from the authors.

REFERENCES

- (1) National Research Council, Sanitary Engineering Committee: Report on cross-connections. *J. Am. Water Works A.* 37: 427-441, May 1945.
- (2) Croft, H. P.: Cross-connections causing illness. *J. Am. Water Works A.* 40: 1129, October 1948.
- (3) Fraser, R.: A study of epidemic catarrhal jaundice. *Canad. J. Pub. Health* 22:396-411, August 1931.
- (4) Hallgren, R.: Epidemic hepatitis in the county of Västerbotten in northern Sweden. *Acta. med. Scandinav. Supp.* 140, pp. 1-104 (1942); 115: 22-39 (1943).
- (5) Gauld, R. L.: Epidemiological field studies of infectious hepatitis in the Mediterranean Theater of Operations. *Am. J. Hyg.* 43: 255-272, May 1946.
- (6) Olin, G.: A hepatitis epidemic presumably spread by water. *Acta. med. Scandinav. Supp.* 196, pp. 381-391 (1947).
- (7) Neefe, J. B., and Stokes, J., Jr.: An epidemic of infectious hepatitis apparently due to a water-borne agent. *J. A. M. A.* 128: 1063-1075, Aug. 11, 1945.
- (8) Tucker, C. B., and Farrell, R. P.: An outbreak of infectious hepatitis apparently transmitted through water. *South. M. J.* 47: 732-740, August 1954.



No Proof of Actual Harm Required In Water Pollution Abatement Action

The Appellate Court of Illinois recently held that, under a statute which defined pollution as including the "alteration of the physical, chemical or biological properties of water," the discharge by a municipality of untreated sewage into the Big Muddy River was subject to abatement by order of the Illinois State Sanitary Water Board on proof that such discharge adversely affected bacterial life normally present in the water. There was also testimony that the sewage discharge resulted in conditions detrimental to fish life.

The court rejected the argument that the board had no power to act except to abate a common law nuisance or without at least a showing of actual harm to fish or of human illness. Such restrictions, the court held, al-

though applicable to private suits, could not limit the board's powers to prevent pollution before actual harm resulted.

This is the first reported case involving the definition of "pollution" contained in the "Suggested State Water Pollution Control Act" (published by the Public Health Service in 1950), which was closely followed in the Illinois statute. *City of Murphysboro v. Sanitary Water Board of Ill.* 134 NE 2d 522 (4th Dist., Ill., 1956).

The "Suggested State Water Pollution Control Act" was endorsed by the Council of State Governments and recommended to the States in the council's "Suggested State Legislation; Program for 1951" issued in November 1950.

Sanitary Engineering Degrees Awarded in 1955

BY EDMUND J. LAUBUSCH, M.S., and
HARVEY F. LUDWIG, M.S.

FOR the academic year 1954-55, there were 141 graduates from undergraduate sanitary engineering courses in the United States. In this same period, there were 145 graduate degrees conferred: 134 master's and 11 doctor's. The academic year, July 1954-June 1955, covers degrees granted in August 1954, February 1955, and June 1955.

Mr. Laubusch, now with the Chlorine Institute, Inc., was formerly senior assistant sanitary engineer, and Mr. Ludwig is sanitary engineer director, Division of Sanitary Engineering Services, Public Health Service.

Engineering degrees awarded in 1955 to persons with sanitary engineering training, United States

Institution	Doctor's	Master's	Bachelor's	Institution	Doctor's	Master's	Bachelor's
Alabama Polytechnic Institute		0	-----	Michigan College of Mining and Technology ⁵		1	9
Alabama, University of	1	0	1	Michigan State College	0	2	2
Arkansas, University of		1	-----	Michigan, University of	0	8	3
California Institute of Technology	2	0	30	Minnesota, University of	0	4	0
California, University of	0	12	4	Mississippi State College	0	10	
Case Institute of Technology	0	1	0	Missouri School of Mines and Metallurgy	7	0	4
Connecticut, University of		0	-----	Missouri, University of	2	32	4
Cornell University	1	1	0	New York University	0	8	7
Florida, University of	(4)	0	4	Newark College of Engineering	7	3	5
Georgia Institute of Technology	0	1	4	North Carolina State College ⁶	2	-----	
Harvard University	5	24	-----	North Carolina, University of	5	-----	
Idaho, University of		3	1	North Dakota, University of			0
Illinois Institute of Technology		0	-----	Northwestern University	0	0	-----
Illinois, University of ⁵	0	2	6	Ohio State University ⁵	0	0	0
Iowa State College ⁶	0	0	3	Oklahoma Agricultural and Mechanical College ⁶	10	0	1
Iowa, State University of	0	1	4	Oklahoma, University of		8	0
Johns Hopkins University	2	6	-----	Oregon State College ⁶	0	1	5
Kansas, University of	1	0	2	Pennsylvania State University ⁵	0	1	4
Kentucky, University of	7	0	-----	Purdue University	1	4	2
Maine, University of	7	0	0	Rensselaer Polytechnic Institute	0	0	5
Manhattan College			24	Rutgers University ⁵		1	0
Massachusetts Institute of Technology ⁵	2	12	4				

See footnotes at end of table.

The institutions offering sanitary engineering training at various academic levels and the numbers of degrees conferred are shown in the table. Similar data for the 62-year period 1889-1950 are available in the literature (1).

Undergraduate Degrees

All but 12 of the 44 colleges and universities reporting the availability of undergraduate sanitary engineering training had graduates. For the academic years 1952-53 and 1953-54, the numbers of graduates were 216 and 164, respectively. The average number of graduates per year for the previous 5-year period, 1950-54, was 225.

Master's Degrees

Of the 134 master's degrees awarded in 1955, 100 were awarded to United States citizens. Twenty, or about 37 percent, of the colleges and universities reporting the availability of graduate sanitary engineering training at this academic level had no graduates. For the aca-

Engineering degrees awarded in 1955 to persons with sanitary engineering training, United States—Continued

Institution	Doc-tor's	Mas-ter's	Bach-elor's	Institution	Doc-tor's	Mas-ter's	Bach-elor's
Santa Clara University-----			0	Utah Agricultural College-----			2
South Dakota State College-----	0	2		Utah, University of-----	³ 1		
Southern California, University of-----	³ 1	4		Virginia Polytechnic Institute-----	0	2	4
Tennessee, University of-----	0	2		Washington, State College of-----	0	0	0
Texas, Agricultural and Mechanical College of ⁶ -----	² ¹¹ 0	³ ¹² 2	1	Washington, University of ⁶ -----	0	4	0
Texas, University of-----	² 0	¹³ 6	2	West Virginia University-----	⁷ 0		1
Tulane University-----	³ 0	2		Wisconsin, University of-----	0	³ 5	5
				Total-----	11	134	141

Leaders (-----) indicate no courses offered at this level.

¹ Master's in engineering with major in sanitary engineering. ² Doctor's in civil engineering with major in sanitary engineering. ³ Master's in civil engineering with major in sanitary engineering. ⁴ Doctor's in sanitary engineering starting September 1955. ⁵ Has an undergraduate sanitary engineering curriculum. ⁶ Sanitary engineering courses are available as electives rather than as an option to the civil engineering program. ⁷ Master's in civil engineering with sanitary engineering electives or minor. ⁸ One "sanitary engineer" degree awarded (same as science degree except creative research not required). ⁹ One professional degree awarded; no thesis required. ¹⁰ Doctor's in engineering with specialization in sanitary engineering. ¹¹ Doctor's in municipal and sanitary engineering. ¹² Master's in municipal and sanitary engineering. ¹³ Also includes master's in civil engineering with major in sanitary engineering and master's in mechanical with major in sanitary engineering.

demic years 1952-53 and 1953-54, the numbers of graduates receiving master's degrees were 102 (20 by foreign nationals) and 120 (25 by foreign nationals) respectively. The average number of master's degrees conferred per year for the previous 5-year period, 1950-54, was 125.

Doctor's Degrees

Nine of the 11 doctor's degrees conferred during this period by four institutions were to United States citizens. Twenty-four other institutions offering sanitary engineering training at this academic level had no successful candidates this year. For the academic years 1952-53 and 1953-54, the numbers of graduates receiving

doctor's degrees were 5 (3 by foreign nationals) and 9, respectively. In the previous 5-year period, 1950-54, the average number of doctor's degrees conferred per year was 6.8.

REFERENCE

- (1) Miller, Arthur P.: Graduates from undergraduate sanitary engineering courses in the United States. Pub. Health Rep. 66: 369-374, Mar. 23, 1951.

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NOTE: Multilithed copies of this continuing report on sanitary engineering degrees, covering the years 1952-54, are available from the Division of Sanitary Engineering Services, Public Health Service.



Milk Sanitation Honor Roll for 1954-56

Thirty-four communities have been added to the Public Health Service milk sanitation "honor roll" and 69 communities on the previous list have been dropped. This revision covers the period from July 1, 1954, to June 30, 1956, and includes a total of 251 cities and 39 counties.

Communities on the "honor roll" have complied substantially with the various items of sanitation contained in the milk ordinance suggested by the United States Public Health Service. The State milk sanitation authorities concerned report this compliance to the Public Health Service. The rating of 90 percent or more, which is necessary for inclusion on the list, is computed from the weighted average of the percentages of compliance. Separate lists are compiled for communities in which all market milk sold is pasteurized, and for those in which both raw milk and pasteurized milk is sold.

The suggested milk ordinance, on which the milk sanitation ratings are based, is now in effect through voluntary adoption in 427 counties and 1,608 municipalities. The ordinance also serves as the basis for the regulations of 34 States and 2 Territories. In 11 States and the 2 Territories it is in effect statewide.

The ratings do not represent a complete measure of safety, but they do indicate how closely a community's milk supply conforms with the standards for grade A milk as stated in the suggested ordinance. High-grade pasteurized milk is safer than high-grade raw milk because of the added protection of pasteurization. The second list, therefore, shows the percentage of pasteurized milk sold in a community which also permits the sale of raw milk.

Although semiannual publication of the list is intended to encourage communities operating under the suggested ordinance to attain and

This compilation is from the Division of Sanitary Engineering Services of the Bureau of State Services, Public Health Service. The previous listing was published in Public Health Reports, March 1956, pp. 327-330. The rating method was described in Public Health Reports 53: 1386 (1938). Reprint No. 1970.

maintain a high level of enforcement of its provisions, no comparison is intended with communities operating under other milk ordinances. Some communities might be deserving of inclusion, but they cannot be listed because no arrangements have been made for determination of their ratings by the State milk sanitation authority concerned. In other cases, the ratings which were submitted have lapsed because they were more than 2 years old. Still other communities, some of which may have high-grade milk supplies, have indicated no desire for rating or inclusion on this list.

The rules for inclusion of a community on the "honor roll" are:

1. All ratings must be determined by the State milk sanitation authority in accordance with the Public Health Service rating method, which is based upon the grade A pasteurized milk and the grade A raw milk requirements of the Public Health Service milk ordinance. (A departure from the method described consists of computing the pasteurized milk rating by weighting the pasteurization plant rating twice that of the raw milk intended for pasteurization.)

2. No community will be included

on the list unless both its pasteurized milk and its retail raw milk ratings are 90 percent or more. Communities in which only raw milk is sold will be included if the retail raw milk rating is 90 percent or more.

3. The rating used will be the latest submitted to the Public Health Service, but no rating will be used which is more than 2 years old. (In order to promote continuous rigid enforcement rather than occasional "cleanup campaigns," it is suggested that when the rating of a community on the list falls below 90 percent, no resurvey be made for at least 6 months. This will result in the removal of the community from the subsequent semiannual list.)

4. No community will be included on the list whose milk supply is not under an established program of official routine inspection and laboratory control provided by itself, the county, a milk control district, or the State. (In the absence of such an official program there can be no assurance that only milk from sources rating 90 percent or more will be used continuously.)

5. The Public Health Service will make occasional check surveys of cities for which ratings of 90 percent or more have been reported by the State. (If the check rating is less than 90 percent, but not less than 85, the city will be removed from the 90-percent list after 6 months unless a resurvey submitted by the State during this probationary period shows a rating of 90 percent or more. If the check rating is less than 85 percent, the city will be removed from the list immediately. If the check rating is 90 percent or more, the city will be retained on the list for 2 years from the date of the check survey, unless a subsequent rating during this period warrants its removal.)

Communities awarded milk sanitation ratings of 90 percent or more, July 1954-June 1956

100 PERCENT OF MARKET MILK PASTEURIZED

<i>Community</i>	<i>Date of rating</i>	<i>Community</i>	<i>Date of rating</i>	<i>Community</i>	<i>Date of rating</i>
<i>Arizona</i>					
Phoenix	11-21-1955	Calumet region	5-26-1955	<i>Indiana—Continued</i>	
<i>Arkansas</i>		East Chicago		<i>Kentucky—Continued</i>	
Fort Smith	8-26-1954	Gary		Newport and Campbell	
<i>Colorado</i>		Hammond		County	10-20-1955
Boulder County	2-25-1955	Crawfordsville	4-20-1955	Owensboro	5-17-1956
Colorado Springs	1-19-1956	Elkhart, Goshen,		Paducah	8-5-1955
Denver	10-28-1955	Nappanee area	1-11-1956	Paris and Bourbon	
Pueblo County	2-2-1956	Evansville	12-3-1954	County	5-3-1956
<i>District of Columbia</i>		Greencastle	1-4-1956	Stanford	12-2-1955
Washington	3-12-1956	Indianapolis	9-15-1954	<i>Louisiana</i>	
<i>Florida</i>		La Fayette and		Calcasieu Parish	8-1954
Jacksonville	8-27-1954	West Lafayette	10-14-1954	Lincoln Parish	9-1954
<i>Georgia</i>		Lake County	5-1955	St. Martin Parish	7-1954
Albany	12-16-1954	Crown Point		Vermilion Parish	9-1954
Athens-Clarke County	4-8-1955	Highland		<i>Mississippi</i>	
Atlanta	10-28-1955	Hobart		Clarksdale	10-13-1954
Augusta-Richmond County	7-2-1955	Madison	8-1955	Eupora	2-23-1956
Bainbridge	1-19-1956	Monticello	12-6-1955	Greenville	9-14-1954
Cairo	2-25-1955	Mount Vernon	10-18-1954	Greenwood	4-25-1956
Calhoun	7-28-1955	Muncie	11-23-1954	Grenada	11-15-1955
Camilla	9-9-1955	New Castle	11-1954	Houston	6-1-1955
Columbus	2-17-1955	Peru	2-1955	Iuka	7-19-1955
Dalton, Whitfield County	9-9-1955	Shelbyville	9-1954	Kosciusko	8-10-1955
Dublin	3-18-1955	South Bend	5-2-1956	Meadville	10-13-1954
La Grange	12-16-1955	Terre Haute	2-3-1955	New Albany	1-18-1956
Moultrie	11-4-1955	Vincennes	3-7-1955	Oxford	12-14-1955
Quitman	8-25-1955	<i>Iowa</i>		Picayune	11-4-1955
Savannah, Chatham County	8-12-1954	Dubuque	12-2-1954	Starkville	3-26-1956
Statesboro	12-3-1954	<i>Kentucky</i>		Vicksburg	7-10-1954
Valdosta	4-18-1956	Bardstown	3-1955	West Point	5-26-1955
<i>Idaho</i>		Bowling Green	11-17-1955	<i>Missouri</i>	
Jerome	11-24-1954	Brandenburg	8-12-1954	Cape Girardeau	8-11-1954
<i>Illinois</i>		Campbellsville	4-8-1955	Kansas City	9-13-1954
Chicago	6-28-1955	Frankfort	7-23-1955	St. Joseph	6-9-1955
<i>Indiana</i>		Fulton	12-23-1955	St. Louis	11-28-1955
Anderson	6-9-1955	Georgetown	10-16-1954	Springfield	11-25-1954
Bedford	8-30-1954	Hopkinsville	11-17-1955	<i>Nevada</i>	
Brazil	12-21-1955	Leitchfield	11-24-1954	Ely, McGill, and Ruth	4-19-1955
<i>North Carolina</i>		Louisville and Jefferson County	4-19-1956	<i>North Carolina</i>	
<i>North Carolina</i>		Mayfield	9-16-1955	Beaufort County	3-31-1955
<i>North Carolina</i>		Monticello	7-13-1954	Bertie County	3-31-1955
<i>North Carolina</i>		Morgantown	6-5-1956	Bladen County	6-6-1955
<i>North Carolina</i>		Murray	3-16-1956		

Communities awarded milk sanitation ratings of 90 percent or more, July 1954-June 1956—Con.

100 PERCENT OF MARKET MILK PASTEURIZED

<i>Community</i>	<i>Date of rating</i>	<i>Community</i>	<i>Date of rating</i>	<i>Community</i>	<i>Date of rating</i>
<i>North Carolina—Continued</i>					
Chatham County	4- 5-1955	Kingsport	11- 9-1955	Tyler	10-22-1954
Craven County	1-20-1956	Knoxville	8-26-1955	Vernon	10-26-1955
Cumberland County	3-16-1956	Lebanon	8-27-1954	Victoria	11-24-1954
Durham County	7-27-1954	Manchester	10-21-1954	Wichita Falls	1-10-1956
Forsyth County	1-31-1955	Maryville-Alcoa	11-23-1954		
Halifax County	2-16-1956	Memphis	6-29-1955	<i>Utah</i>	
Iredell County	11-17-1954	Murfreesboro	7-14-1955	Ogden	10-18-1955
Lee County	4- 8-1955	Nashville and Davidson		Salt Lake City	2-10-1956
Lenoir County	1- 7-1955	County	10-27-1955		
New Hanover County	5-24-1956	Newbern	10-28-1954	<i>Virginia</i>	
Onslow County	5-16-1955	Newport	10- 5-1954	Bristol	11- 3-1955
Orange County	4- 5-1955	Pulaski	9- 1-1955	Buena Vista	10-28-1955
Pender County	5-16-1955	Rogersville	11- 7-1955	Front Royal	11-10-1955
Person County	4- 5-1955	Springfield	7-23-1955	Glasgow	10-28-1955
Pitt County	4-20-1955	Sweetwater	10- 7-1954	Lexington	10-28-1955
Tyrrell County	8- 5-1955	Winchester	10-21-1954	Luray	11-11-1955
Washington County	8- 5-1955			Norfolk	6- 1-1956
Wilson County	10-18-1955			Richmond	4- 6-1956
<i>Oklahoma</i>					
Ardmore	4-13-1956	Beaumont	5-24-1955	Roanoke	8-20-1954
Bartlesville	3- 8-1955	Brownfield	5- 6-1955	South Boston	4-13-1956
Guthrie	5-11-1955	Brownwood	7-16-1954	Suffolk	7- 1-1954
Mangum	10-27-1955	Bryan	8-30-1954	Williamsburg	10-25-1955
Okmulgee	3-16-1955	Burkburnett	8-16-1955		
Seminole	10- 1-1954	Cleburne	3-13-1956	<i>Washington</i>	
Sulphur	2- 9-1956	Corpus Christi	7-26-1955	Spokane	9-16-1954
Tulsa	6-10-1955	Dallas	9-29-1954	Whitman County	10-14-1954
<i>South Dakota</i>					
Aberdeen	8-28-1954	Edinburg	11-21-1955		
Sioux Falls	10-26-1954	El Paso	10-25-1955	<i>Wisconsin</i>	
Sisseton	8-26-1954	Falfurrias	1-21-1955	Baraboo	10-18-1955
<i>Tennessee</i>					
Athens	8-10-1954	Galveston	7-24-1954	Beaver Dam	3-29-1955
Bristol	11- 3-1955	Lufkin	3- 3-1955	Beloit	12-20-1955
Chattanooga	12- 3-1954	Midland	1-21-1955	Burlington	12- 5-1954
Clarksville	2-10-1955	Mineral Wells	12-14-1954	Delavan	12- 5-1954
Cleveland	10-13-1954	Nacogdoches	9- 3-1954	Elkhorn	12- 5-1954
Cookeville	9-21-1955	New Braunfels	9- 2-1954	Fontana	12- 5-1954
Covington	11-12-1954	Odessa	1-21-1955	Fort Atkinson	12- 5-1954
Cowan	10-21-1954	Orange	5-19-1955	Green Bay	10- 6-1955
Decherd	10-21-1954	San Antonio	2- 8-1955	Janesville	11-23-1955
Dyersburg	10-29-1954	San Benito	1- 8-1955	Kenosha	7-14-1955
Elizabethhton	2-23-1955	Sweetwater	11-17-1954	La Crosse	1-14-1955
Gatlinburg	10- 6-1954	Texarkana	3- 9-1956	Lake Geneva	12- 5-1954
Johnson City	9-23-1954			Madison	11-18-1955

Communities awarded milk sanitation ratings of 90 percent or more, July 1954-June 1956—Con.
 BOTH RAW AND PASTEURIZED MARKET MILK

<i>Community and percent of milk pasteurized</i>	<i>Date of rating</i>	<i>Community and percent of milk pasteurized</i>	<i>Date of rating</i>	<i>Community and percent of milk pasteurized</i>	<i>Date of rating</i>
<i>Georgia</i>					
Carroll County, 97.5-----	3-24-1955	Missoula, 99-----	11- 5-1954	Amarillo, 99.3-----	4-11-1955
Cartersville, 97.7-----	1-26-1955			Brady, 94-----	8- 7-1954
Cedartown, 97.7-----	11-19-1954			Brenham, 94-----	6-13-1956
Gainesville-Hall County, 92.1 -----	5-20-1955			Childress, 83.4-----	4-22-1955
Griffin, 98.2-----	9- 3-1954			Fort Worth, 99.98-----	2-29-1956
Macon, 99.7-----	6-23-1955			Gainesville, 95-----	12- 1-1954
Newnan, 95-----	5- 3-1956			Gladewater, 98.8-----	7-14-1954
Pelham, 94-----	9- 7-1955			Longview, 99.6-----	7-14-1954
Thomaston, 91.5-----	5- 3-1956			Lubbock, 99.4-----	6-14-1956
Washington, 99.7-----	11-18-1955			McAllen, 99.2-----	11-21-1955
Winder-Barrow County, 98.5 -----	3-10-1955			Mercedes, 99-----	11-21-1955
<i>Kentucky</i>					
Henderson, 98.9-----	9-23-1954			Paris, 98-----	2- 2-1956
Princeton, 96-----	5-19-1955			San Angelo, 99.7-----	9- 1-1955
Somerset, 95-----	2- 7-1955			Seminole, 93.9-----	5-11-1955
<i>Missouri</i>					
Joplin, 97.5-----	9- 8-1955			Waco, 99.76-----	3-19-1956
Moberly, 94.2-----	3- 1-1955			<i>Oregon</i>	
Poplar Bluff, 97.4-----	8-18-1955			Portland, 99.4-----	7-30-1955
<i>Tennessee</i>					
				<i>Virginia</i>	
				Charlottesville, 99.4-----	10-17-1955
				Lynchburg, 98.8-----	12-----1954
<i>Washington</i>					
				Tacoma, 99.7-----	7-16-1954

NOTE: In these communities the pasteurized market milk shows a 90-percent or more compliance with the grade A pasteurized milk requirements, and the raw market milk shows a 90-percent or more compli-

ance with the grade A raw milk requirements, of the milk ordinance suggested by the United States Public Health Service.

Note particularly the percentage of the milk pasteurized in the vari-

ous communities listed. This percentage is an important factor to consider in estimating the safety of a city's milk supply. All milk should be pasteurized, either commercially or at home, before it is consumed.



Child Guidance Clinic Policy and Practices

THIS REVIEW of the personal, physical, psychological, and social characteristics of patients seen in the Los Angeles Child Guidance Clinic attempts to ascertain whom the clinic served and to derive, as far as possible, some ideas of the problems most suitable for child guidance clinic services, the procedures of intake and of closing cases, and how worth while the work of the clinic seemed to be.

The 500 cases studied were divided into two groups: 450 successive cases for which full responsibility was taken by the clinic and 50 cases for which major responsibility was taken by some other agency. In the latter, known as cooperative cases, the major role of the clinic was that of consultant and, sometimes, provider of continued psychiatric treatment.

All evaluations of medico-psychiatric procedures were the responsibility of the psychiatrist, who had had a major administrative responsibility for overall policies of the clinic for many of the preceding years. The procedures of experienced social research were applied, and a rather large listing of problems by category was worked out.

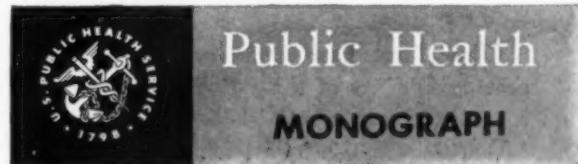
Some of the more significant conclusions reached and further questions raised were:

1. About 12 percent of the cases were considered unequivocally successful and 47 percent, partially successful. Criteria applied were disappearance or diminution of symptoms, clarification of parent-child relationships, insight into problems by patient or responsible adults, and clarification of problems to agencies.

2. Sharp clarification of the basic orientation of the agency. Is it primarily medical or psychiatric or social casework? What evidence is there that the clinic team functioned to best advantage? The conclusion was that only about one-fifth of the cases clearly called for a team approach; the others seemed to warrant referral

to casework agencies, private psychologists, school clinics, or other facilities not involving the specialized expense and complexity of the child guidance clinic.

3. What should be the relationship of the child guidance clinic toward other agencies in the community? Integration into the work of a health and welfare agency? Or should it



No. 42

The accompanying summary covers the principal findings presented in Public Health Monograph No. 42, published concurrently with this issue of Public Health Reports. At the time of the study, the authors were with the Los Angeles Child Guidance Clinic, Los Angeles, Calif.

Readers wishing the data in full may purchase copies of the monograph from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. A limited number of free copies are available to official agencies and others directly concerned on specific request to the Public Inquiries Branch of the Public Health Service. Copies will be found also in the libraries of professional schools and of the major universities and in selected public libraries.

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Anderson, Forrest N., and Dean, Helen C.: Some aspects of child guidance clinic intake policy and practices. Public Health Monograph No. 42 (Public Health Service Publication No. 485). 16 pages. U. S. Government Printing Office, Washington, D. C., 1956. Price 20 cents.

remain somewhat isolated as a highly specialized technical service?

4. Who should refer cases to the clinic? Is it desirable to have parents apply directly for clinic service when only a very small number of cases can be served in a huge area? Or should referrals come through physicians or professional agencies in which some degree of preliminary screening has been done?

5. The question of the suitability of many cases for clinic service is raised since 31 percent of the cases were closed out for reasons which amounted to "against the advice of the clinic."

6. What evidence is there that cases referred on the basis of symptoms which fall into certain categories are more amenable to treatment than other cases? That is, are cases in which symptoms are concrete, specific items of undesirable behavior more treatable than those in which symptoms are described in terms of generalized abstractions or "cause"?

The study does not give any definitive answers but is believed to raise a number of significant questions, with sufficient data on many of them to provide a basis for further studies.

Confirm Efficacy of Salt and Soda Solution

Clinical tests have confirmed the earlier laboratory findings of three Public Health Service scientists, Dr. Sanford M. Rosenthal, Herbert Tabor, and R. Carl Millican, that oral consumption of salt and soda solution in large amounts is an effective emergency treatment for shock due to burns.

The tests were conducted in Lima, Peru, by Peruvian and American scientists, headed by Dr. Kehl Markley, under the sponsorship of the Public Health Service. Reporting in the *Journal of the American Medical Association*, August 11, 1956, they said no toxic effects from the use of the saline solution, even though it was administered in large amounts, were observed in any of the 193 severely burned patients.

A simple, effective procedure for treatment of shock, which so often kills victims of severe burns during the first 48 hours after injury, is particularly valuable in a major disaster. As the saline solution may be prepared easily of materials available in almost every home (table salt, baking soda, and tap water) the method may save many lives in disasters when skilled medical care is not promptly available.

Shock formerly caused countless deaths among victims of burns and other types of injury. During the past 20 years, intravenous injection of whole blood, plasma, or the so-called plasma extenders has proved effective

in preventing such effects of shock. The difficulties of intravenous therapy, however, are considerable, and they are overwhelming in a major disaster.

Even today, a high proportion of early deaths among victims of burns covering 10 percent or more of the body area is attributable to shock. The trauma induces a state of profound physical and mental depression, usually 3 to 5 hours following injury. Its chief features include the following: marked fall in blood pressure; feeble and rapid pulse; decreased respiration; a sudden and intense, although incomplete, suspension of vital body functions; and, sometimes, unconsciousness. The victim's skin is pale and clammy. In burns, loss of circulating body fluids sets up an immediate and pressing need for replacement.

The saline solution used during the clinical tests may be approximated, for emergency purposes, by dissolving a teaspoonful of table salt and one-half teaspoonful of baking soda in a quart of drinking water. The patient should be encouraged to drink as much as he can of this solution. Of course, liquids should not be given to persons who are unconscious or who cannot swallow. A victim of burns may require as much as 6 or 7 quarts or more during the first 12 hours following injury.

Experimental Approach to DDT Toxicity

Many human health problems have been created with the introduction of chlorinated hydrocarbons as pesticides. Much interest has centered around food residues, since one common method of application of these insecticides has been deliberately to use their residue effect for pest control. Owing to previous experience with other types of insecticides having a residue effect, there is an extensive precedent for food sampling, chemical analysis, legislation, and field regulations. However, to do this intelligently, the magnitude of the problem has to be carefully defined.

Specifically, in regard to chlorinated hydrocarbons there is no argument that these compounds are dangerous and lethal when ingested in large amounts. The only difference of opinion relates to the exact level at which a given food residue becomes sufficiently large so that its potential hazard to man outweighs its value for insect control. The development of insect resistance and tolerance is likely to make this type of decision increasingly difficult. DDT (2,2-bis-(*p*-chlorophenyl)-1,1,1-trichloroethane) is a typical example of a chlorinated hydrocarbon in extensive field use. This was the compound selected for experimentation.

In view of the importance of safeguarding human life, while permitting agriculture to use these chemicals as indicated, it would appear that there is a need for more basic information on the physiological effect of human exposure to low doses of these compounds. One approach is to simulate the human experience by continuously feeding various levels of DDT incorporated into the diet of white rats. This method, even though representing a laboratory simplification of field conditions, creates new difficulties in the evaluation of the significance of tissue changes or biochemical abnormalities.

Ultimately, the extrapolation of animal studies to human medicine represents the most vexing problem of all.



No. 43

The accompanying summary covers the principal findings presented in Public Health Monograph No. 43, published concurrently with this issue of Public Health Reports. The senior author is with the National Cancer Institute, Public Health Service, Bethesda, Md.; and the junior authors are with the Technical Development Laboratories, Communicable Disease Center, Public Health Service, Savannah, Ga.

Readers wishing the data in full may purchase copies of the monograph from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. A limited number of free copies are available to official agencies and others directly concerned on specific request to the Public Inquiries Branch of the Public Health Service. Copies will be found also in the libraries of professional schools and of the major universities and in selected public libraries.

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Ortega, Paul, Hayes, Wayland J., Jr., Durham, William F., and Mattson, Arnold: DDT in the diet of the rat. Public Health Monograph No. 43 (Public Health Service Publication No. 484). 27 pages. Illustrated. U. S. Government Printing Office, Washington, D. C., 1956. Price 30 cents.

Briefly, our experiments used 178 male and 104 female white rats fed levels of DDT from less than 0.05 parts per million of the poison in the diet as a whole up to 5,000 p.p.m. from periods of 2 weeks to 20 months. The animals were studied for clinical manifestations of toxicity, for gross and microscopic tissue changes, for rapidity of development and permanence of histopathology, and for recovery on a DDT-free diet after previous exposures. Special biochemical tests were used for body fat and tissue storage of DDT, as well as for liver function determinations. Certain laboratory devices

such as serial liver biopsy and study of different chemical isomers of this molecule added some supplementary information.

To summarize the results of the experiment, the salient feature among numerous other data was that cellular alterations could be demonstrated in the liver of rats fed DDT at levels as low as 5 p.p.m. in the diet. However, the findings indicated that stress should be placed on the mildness of these changes, their ready reversibility, and their imperfect correlation with liver function or with the clinical symptomatology of DDT.

technical publications

Infectious Hepatitis in New Delhi

Report of the Committee Investigating the Epidemic of Jaundice, December 1955—January 1956

Public Health Service Reprint from the Hindustani Standard, February 18, 1956. 28 pages. Mimeographed.

The text of a report by the committee which investigated the recent outbreak of infectious hepatitis in New Delhi, India, has been reproduced and is available in limited quantities from the Water Supply and Water Pollution Program, Robert A. Taft Sanitary Engineering Center, Cincinnati 26, Ohio, Attention: Dr. R. L. Woodward.

The report documents the first waterborne infectious hepatitis outbreak associated with a water supply treated in a modern water treatment plant providing coagulation,

rapid sand filtration, and chlorination. Bacteriological tests for coliform bacteria showed no evidence of contamination.

The report holds that the authorities concerned had taken the necessary steps to guard against bacterial contamination of the water but not against viral infection.

Design for Statewide Nursing Surveys

Public Health Service Publication No. 460. 88 pages. 50 cents.

The latest techniques for finding the extent of nurse shortages and removing some of the causes are contained in a new manual prepared by the Division of Nursing Resources. Design for Statewide Nursing Surveys tells how to organize a survey committee, how to obtain community support for making surveys, and how

to gather and analyze information on local supply and nurse shortages.

A section on reappraisal of nursing needs and resources tells how to set up a plan for periodic fact finding after the basic survey has been made. Examples of progress in some 40 States which have made preliminary surveys, samples of the letters, forms, and tables used for compiling the facts, and suggested guides for evaluating adequacy of nurse supply are given.

This section carries announcements of all new Public Health Service publications and of selected new publications on health topics prepared by other Federal Government agencies.

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